

# DIRECT TO POINTS

## (THE SABASABA)

# A'Level Sub - ICT

## A Competency Based Approach

THEORY+ PRACTICAL+ CD OF SUPPORT FILES



=SUM(A1:A5)  
=COUNT(A1:A5)  
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### Author

Kichu Shadrack Enoch  
ICT Dept. Seeta High School  
Bic. Computer Science,  
Makerere University

### Edited by

Kaggwa Maurice  
ICT Dept. Seeta High School  
Bic. Computer Science,  
Makerere University

### Revised by

ICT Dept. Uganda Martyrs S.S. Namugongo  
MSc Data Communication &  
Software Engineering - Makerere University

## **Acknowledgement**

Writing a book is a monumental task. In many ways' authors fulfil their writing after receiving support from other people, directly or otherwise. Working with great educationists means a persistent demand for excellent results and having pragmatic ways of ensuring that this excellence is in place.

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Students that I have taught for several years can never be forgotten. The impact that students exerted on the author's experience can't be ignored. On several occasions, the author could give assignments to his students and found out that some of their presentations were worthy to be documented. This is how this book could aggregate into a mighty educational tool that no one can afford to ignore!

## **Foreword**

In today's rapidly evolving digital age, computer knowledge is not just a skill – it is a necessity. This book has been written with the vision of equipping A' Level students with relevant, practical, and foundational concepts in computing and emerging technologies. It provides a well structured and up to date syllabus-based guide that balances theory and real-world applications, ensuring that learners gain both academic understanding and technological literacy.

As the world embraces Artificial Intelligence, Cloud Computing, Internet of Things, and other digital revolutions, students must be prepared not only to adapt but also to lead and innovate. This book covers essential areas such as Introduction to Computers, Electronic Presentation, Computer Hardware, Computer Software, Computer Word Processing, Electronic Spreadsheet, Internet and Digital Communications, Electronic Publications, Electronic Databases, Artificial Intelligence (AI) and other Emerging Technologies.

Designed with simplicity and clarity, this book encourages interactive learning through examples, scenario-based questions, and practical exercises. It aims at making computing more accessible and enjoyable for students, whether they aspire to pursue computer science or any field where digital skills are key.

I commend the effort and thought put into this work and believe it will serve as a valuable resource in classrooms and beyond. Let this book inspire the next generation of thinkers, creators, and problem-solvers in the digital world.

**Kichui Shadrack Enock**

**ICT Instructor.**

## How to Use this Book

The book is accompanied with the **Support Files** DVD stuck at the inner back side of the cover to help speed up the process of learning by both students and instructors. The Support Files are stored in folders and subfolders within the DVD.

### Using Support Files

1. To use the Support Files, you have to open the DVD, copy and paste the - **THE SABASABA** folder on your Desktop screen.
2. Double click **THE SABASABA** folder. You will see other three subfolders within, i.e. **DATABASE** for MS Access files, **SPREADSHEET** for MS-Excel files, and **WORD** for MS-Word files subfolders.
3. When you double click any of the subfolders you will again see other two subfolders which are, for **DATABASE** – include **ACCESS ACTIVITIES** and **ACCESS SCENARIO**, for **SPREADSHEET** – include **EXCEL ACTIVITES** and **EXCEL SCENARIO**, and for **WORD PROCESSING** includes **WORD ACTIVITES** and **WORD SCENARIO** subfolders.
4. Follow the step-by-step examples to guide you how to do the parts in every chapter before you attempt any activity.
5. Do not skip any activity in this book.

### DIRECT TO POINTS - THE SABASABA

In this book, the word **SABASABA** – connotes digital revolution. It symbolizes the tremendous transformation that has taken place in digital world. The book is written to cover both theory and practical for Advanced level students.

Students or teachers can find the support files stored within the DVD supplied together with the book. If the DVD fails to open, you can also access the files through our website or use our WhatsApp number 0774568543 for the files to be sent to you for free of charge.

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# TOPIC ONE

## Introduction to ICTs

### 1.1. World of ICT

Do you ever take your time to visit various institutions such as schools, hospitals, banks, worship areas? Do you realize that we can remain in our homes and access information about universities and possibly make our applications online? Do you notice the new trend of making online travel bookings or ordering goods and services? This and many others explain the rapidly growing world of ICT usage that we can't avoid.

#### Activity 1-1

*Visit various departments (offices) in your school and observe the ICT gadgets being used. Together in class, discuss and write down the ICT tools observed and clearly explain what are the ICT tools used for in those departments.*

#### 1.1.1. Definition of ICT

Information and Communication Technology (ICT) refers to all communication technologies such as internet, wireless networks, cell phones, computers, software, and other media that enable users to access, store, retrieve, transmit, and manipulate information in a digital form.

ICT is central to modern society as it supports digital communication, data management, and access to information, making it integral to nearly every field—from education, healthcare, and business to government and society. The primary goal of ICT is to improve efficiency, enhance connectivity, and provide real-time solutions to individuals and organizations.

#### 1.1.2. Components of ICT

Information and Communication Technology (ICT) components can be categorized into several core areas that work together to enable digital communication, data processing, and information sharing. Here are the key components of ICT:

- (a) **Hardware:** Hardware is the physical foundation of ICT, consisting of the devices and equipment used to perform tasks, process data, and connect networks. Here are the main categories of hardware in ICT:
  - **Computers:** Ranging from desktops and laptops to powerful servers, computers are the primary devices used to process data and run applications. Servers, in particular, support large networks by storing and distributing data to multiple users.
  - **Mobile Devices:** Smartphones, tablets, and wearable technology like smartwatches offer portable computing power, enabling communication and data access on the go. With features such as internet connectivity, high-speed processors, and sophisticated apps, these devices are essential in both personal and professional settings.

- **Networking Equipment:** Routers, switches, modems, and firewalls are crucial for connecting devices and enabling data transfer within local and global networks. Routers direct data traffic between networks, while switches connect multiple devices within the same network. Firewalls add a layer of security by monitoring and filtering incoming and outgoing traffic.
- **Peripheral Devices:** Peripherals like printers, scanners, and external storage devices expand the functionality of computers and mobile devices. These devices support tasks like document management, data backup, and media sharing, allowing for enhanced productivity and accessibility.



*Fig. 1-1: Smartphone*

*Fig. 1-2: Barcode reader*

*Fig. 1-3: Computer*

*Fig.1- 4: Printer*

*Fig.1- 5: External Hard disk*

*Fig.1- 6: CCTV Camera*

*Fig. 1-7: Loud Speaker*

### Activity 1-2

You have started a business and the above pictures of ICT tools have been recommended for you to make your business attracts more clients, improve performance and simplify your day-to-day tasks for better profit making. Using your ICT skills, in class group and individually you will explain:

- The role of each of the pictured ICT tools above, stating its major benefits in the running of your business.
- Write down the kind of applications that you will urgently need in your Smartphone and state clearly what and how are you going to use the stated applications to enhance the performance of your business.

- (b) **Software:** Software refers to the programs and applications that run on hardware, enabling users to perform specific tasks, manage data, and communicate. Software in ICT can be categorized as follows:

- **Operating Systems (OS):** The operating system is the software that manages hardware resources and provides an interface for other applications. Examples include Windows, macOS, Linux, Android, and iOS. An OS controls processes, memory, files, and connected devices, forming the backbone on which other software operates.
  - **Application Software:** Application software includes various programs designed for specific tasks. Productivity applications (e.g., Microsoft Office, Google Workspace) support document creation, data analysis, and communication. Industry-specific applications, such as medical record systems or financial software, are tailored to particular fields.
  - **Utility Software:** Utility software is used for system maintenance and optimization, including tools for virus protection, backup, and disk cleanup. Security utilities, like antivirus programs and firewalls, are particularly important in protecting data from cyber threats.
  - **Development Software:** Software development tools, including programming languages and integrated development environments (IDEs), are used to create applications. Examples include Java, Python, Visual Studio, C++, JavaScript - which enable developers to build, test, and deploy new software solutions.
- (c) **Networks:** Networks allow devices to connect and communicate, enabling the exchange of information across various distances. The main types of networks include:
- **Internet:** The Internet is the largest global network, connecting billions of devices worldwide. It allows users to access information, communicate, and utilize services regardless of geographic location. As the backbone of ICT, the Internet supports e-commerce, remote work, and information-sharing on a massive scale.
  - **Local Area Network (LANs):** LANs connect devices within a limited geographic area, such as an office, school, or home. They facilitate resource sharing, like printers and file servers, and enable communication among connected devices. LANs typically use Ethernet cables or Wi-Fi for connectivity.
  - **Wide Area Networks (WAN):** WANs connect multiple LANs across broader geographic areas, often spanning cities, countries, or even continents. The internet itself is a type of WAN, but organizations also build private WANs for secure, long-distance data transmission.
  - **Intranets and Extranets:** An intranet is a private network used within an organization, accessible only to authorized employees. It allows for secure information sharing and collaboration. An extranet extends this access to external stakeholders, such as clients or business partners, with controlled permissions for secure interactions.



**Fig. 1-8:** Networked Systems



**Fig. 1-9:** Telecommunication Systems

# THE TOPIC CONTINUES

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## TOPIC TWO

### Electronic Presentation

#### 2.1. Working with Presentation Software

##### 2.1.1. Definition

Electronic presentation software is a program used for creating text with graphics, audio, and/or video presentations with visual aids, handouts, and sequence of slides.

Examples of presentation software include:

- Microsoft PowerPoint
- Google Slide
- LibreOffice Impress
- Canvas
- Prezi
- Apple Keynote
- Adobe Presenter

##### Common features of presentation software

- **Slides** that can contain any mixture of text, images, video, animations, links and sound.
- **Animation effects** that allow the various elements on each slide to appear after a certain amount of time or when a presenter presses a button.
- **Slide master** – this allows the style (font, font size, background etc.) to be set once and then used throughout the presentation.
- **Transitions** – this is how the presentation software “moves” the display of one slide to another. Transitions usually include dissolving from one slide to the next or the current slide being moved in some way to show the next slide as though it was underneath.
- **Slide notes** – when these are used the presenter will see the current slide and any notes associated with it on his/her display and the audience will see just the slide on another screen or from a projector.
- **Slide Sorter** is a window that displays thumbnail versions of all your slides, arranged in horizontal rows. This view is useful to make global changes to several slides at one time. Rearranging or deleting slides is easy to do in Slide Sorter view.

##### 2.1.2. Starting a Presentation Software

There are many presentations software used around the world. Some are desktop based but others are web-based presentations. However, for the purpose of learning we shall use one of the most widely used presentation software known as **Microsoft PowerPoint**.

Before you create the presentation, you should consider the following key points:

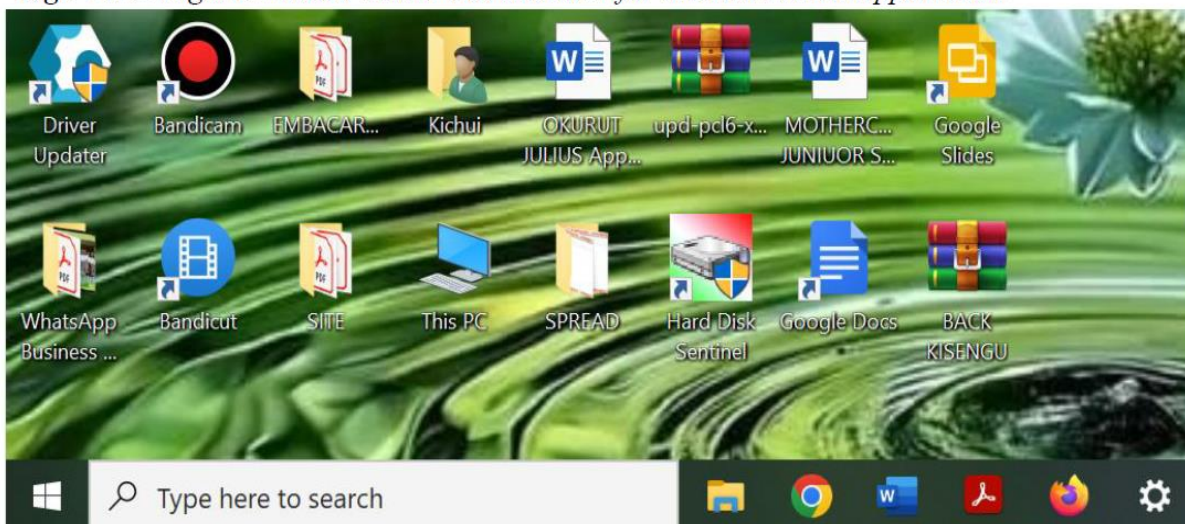
- **The nature of your audience:** - You should understand your audience’s age, background, interest and knowledge level. This can help you to plan the presentation approach.
- **Define your Purpose:** - Find out whether your goal is to inform, persuade, teach or entertain.

- **Content Planning:** - After establishing a topic to present, select relevant information with examples and organize your ideas logically i.e. having introduction, body, and conclusion. Never overload text in your presentation.
- **Visual Design:** - Choose an appropriate template or theme and use readable fonts with color contrast. Add visuals such as images, charts, and graph to support key points.
- **Use of Multimedia:** - Decide if you will include videos, audio or animations. Ensure multimedia elements are relevant and enhance understanding.
- **Time and Number of Slides:** - Ensure that the number of slides can be presented within the allocated time frame. Avoid having too many slides.
- **Technical Requirements:** - Know the presentation software you are using very well (e.g. Microsoft PowerPoint, or Google Slides). Ensure that the application you are using is compatible with display systems (projector, screen resolution).
- **Practice and delivery:** - Rehearse your presentation to build confidence. Prepare for possible questions or interruptions.

### Steps to Open PowerPoint

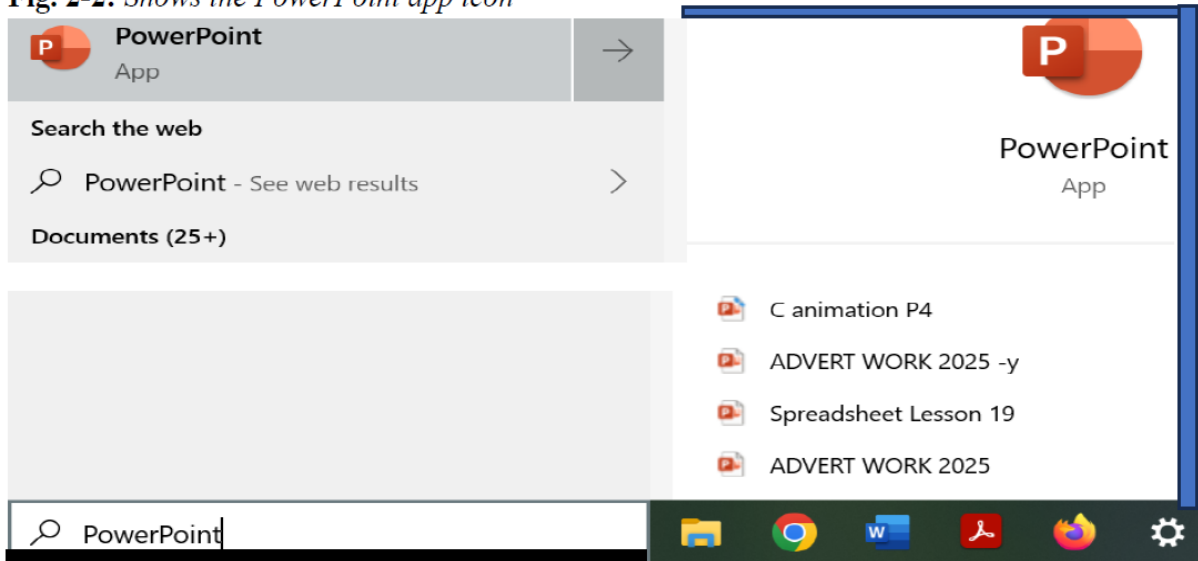
1. You can type **PowerPoint** in the *search box* at the lower right side of the desktop screen by pointing and clicking at the point written **Type here to search**. See **Fig. 2-1** below.

**Fig. 2-1:** Using the Window search box to search for the PowerPoint application.

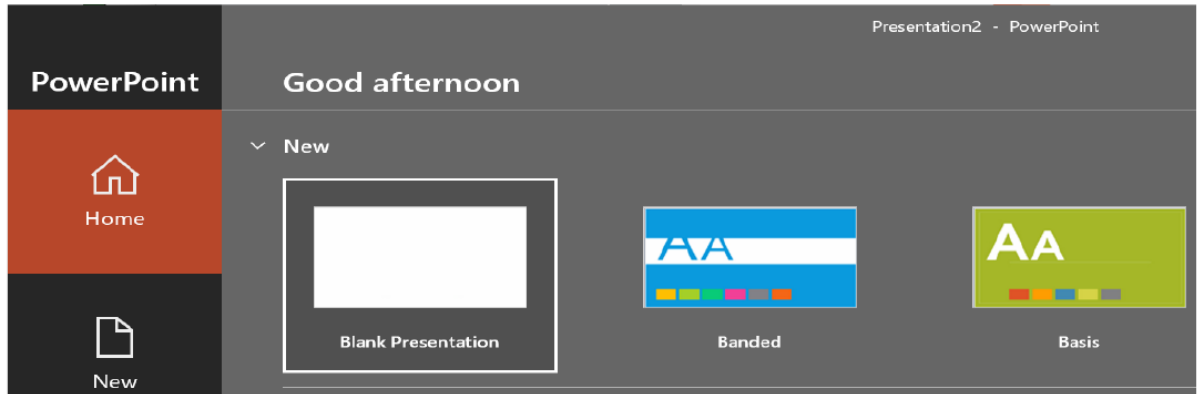


2. In the *search box*, type **PowerPoint**. The **PowerPoint** app icon will show up at the upper right side of the screen as seen in **Fig. 2-2** below.
3. Point and click the **PowerPoint app** icon at the upper right side of the display as seen in the **Fig. 2-2** below. The new display will show up as seen in **Fig. 2-3** below.
4. In the new display seen in **Fig. 2-3**, point and click **Blank Presentation** to start a new and blank file to start editing content. See **Fig. 2-4** below.

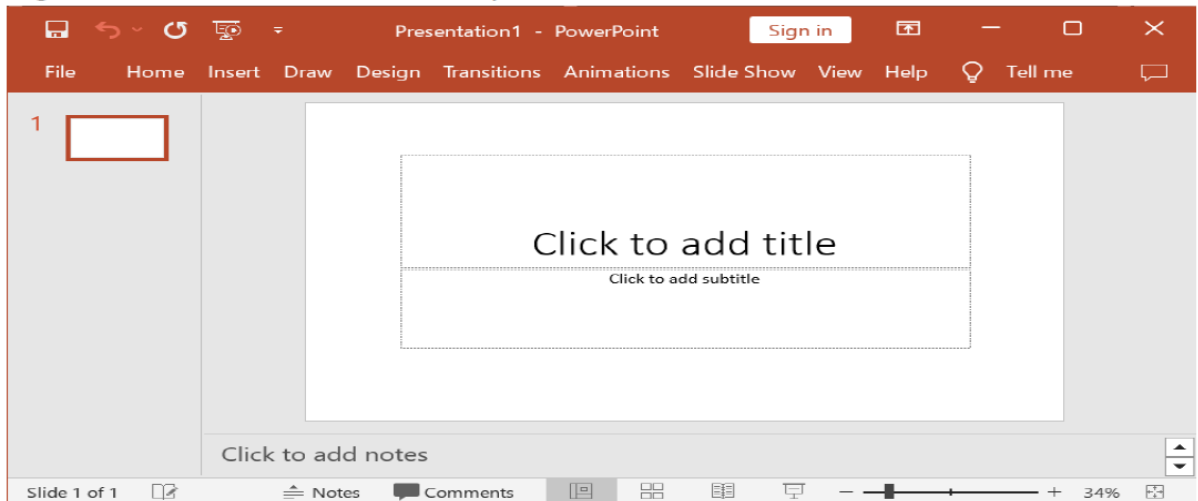
**Fig. 2-2:** Shows the PowerPoint app icon



**Fig. 2-3:** Selecting Blank Presentation.



**Fig. 2-4:** Show the Blank Presentation of one slide.



### 2.1.3. Managing Slide Layouts

When you are working with your presentation using PowerPoint application, one needs to put into consideration the slide layout to select for a particular content. Usually, your presentation slides will be having the following slides layouts:

- **Title Slide:** - This should be the first slide which includes the general heading or theme of the topic that is being discussed. At the lower place holder, the Title Slide also will include the name of presenter. E.g. Presented by: Kichui Shadrack Enock.
- **Title and Content Slide:** - Use this slide when you want to introduce a subsection or topic in the discussion where you will put a sub title and in the content area, you put the key points in a bulleted format.
- **Section Header Slide:** - It is used to introduce a new section or chapter in your presentation. It will include the main title and the option subtitle. This slide is useful only if a presenter will discuss a topic which may have several major sections e.g. Part I, Part II, etc.
- **Two Content Slide:** - This slide can be used to present two pieces of information side by side for either comparison, contrasting, or placing text on one side and related image(s) on the other side.
- **Comparison Slide:** - This slide is designed to compare two items or concepts side by side, with separate heading for each.
- **Title Only Slide:** - This slide has only one place holder for the title and it is meant to be used in a situation where you want to place a clear image or video with title only.
- **Blank Slide:** - This slide layout contains no place holders at all and it is meant to be used for inserting full screen images or videos without interference.

#### Activity 2-1

In group of five to, but should not exceed ten students, you will select a topic to present in class. Establish a topic which identifies a problem within your country (society), establish the root causes, the negative impacts and possible solutions.

In the presentation, the group should focus on the following features:

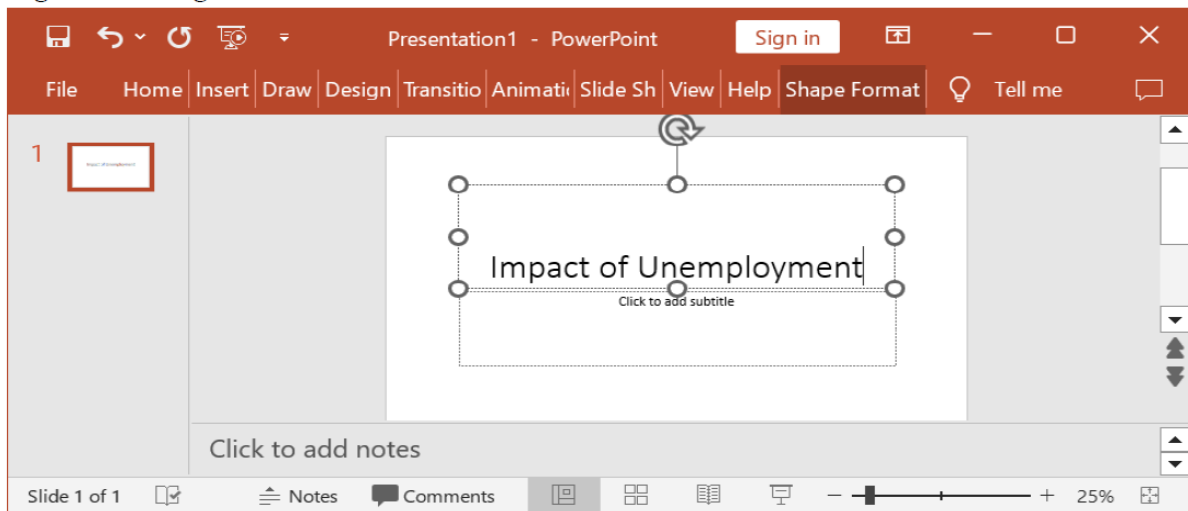
- a) Use of templates and appropriate slide layouts.
- b) Include necessary images to back up your content.
- c) Include short and precise bulleted text only.
- d) Include the speaker notes to be used during the presentation.
- e) Contrasting background and font colors.
- f) Font sizes and font styles.
- g) Slide animations and slide transitions.
- h) Use slide show to present your topic.

### 2.1.4. Building a Presentation

In here, we shall start a simple presentation with a topic titled: **Impacts of Unemployment**. Follow the steps carefully:

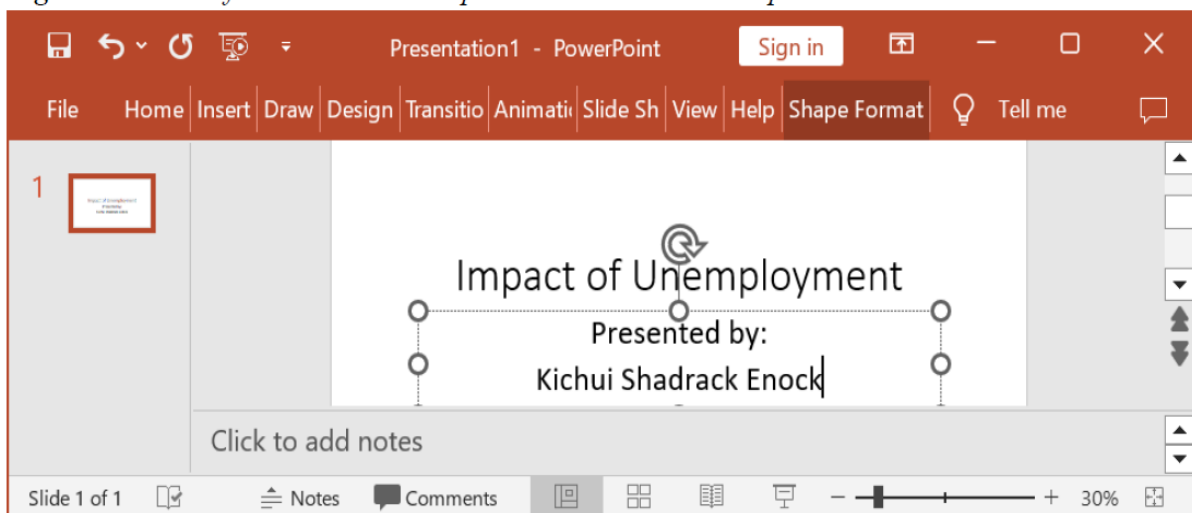
1. Open your PowerPoint presentation following the previous steps. The very first slide to open by default is the **Title Slide** layout. See **Fig. 2-4** above.
2. Click on the upper place holder and type the general title of the topic you are going to discuss. In this case it should be **Impacts of Unemployment**. See **Fig. 2-5** below.

**Fig. 2-5:** *Editing the Title Slide.*



3. In the lower place holder, type the name of the presenter, say: **Kichui Shadrack Enock**. See **Fig. 2-6** below.

**Fig. 2-7:** *Shows a full Title Slide with presentation title and the presenter's name.*

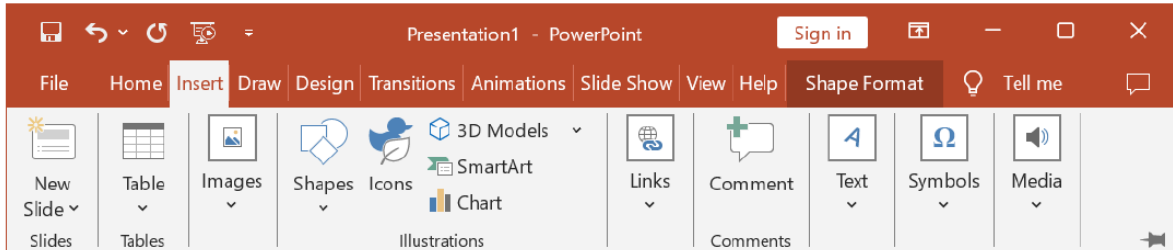


### Inserting new slides

A presentation is built-up from a collection of several slides, possibly with varied layouts. While inserting new slides, consideration of selecting an appropriate slide layout is key. The slide layout will be selected based on preference, or the nature of content that strictly demand a certain slide layout.

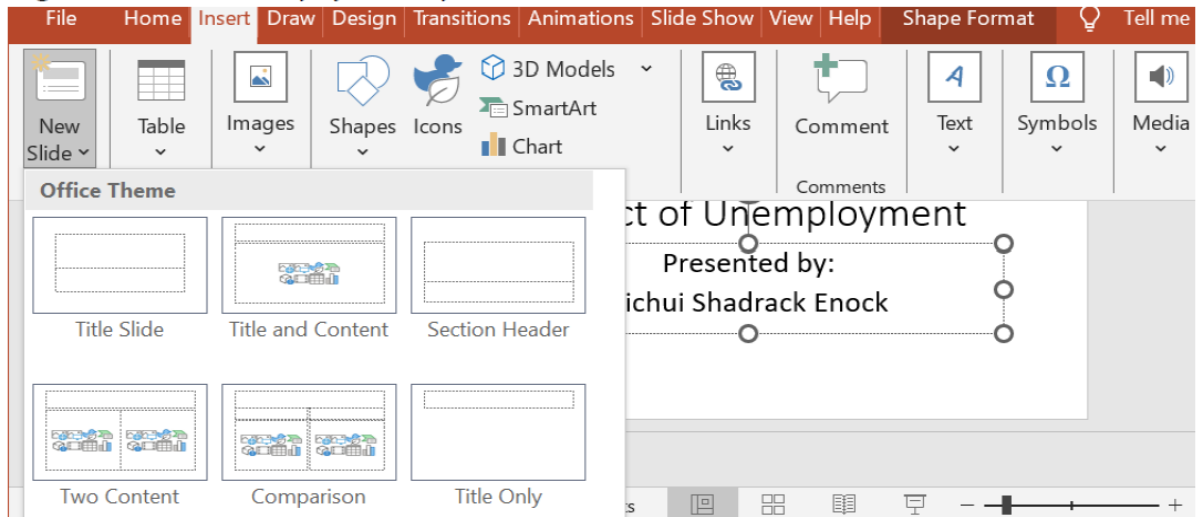
4. To insert a new slide, point and click **Insert** from the upper main menu's list of options. The new pane display, with full of items to select will be displayed. See **Fig. 2-8** below.

**Fig. 2-8:** *Displaying the Insert pane*



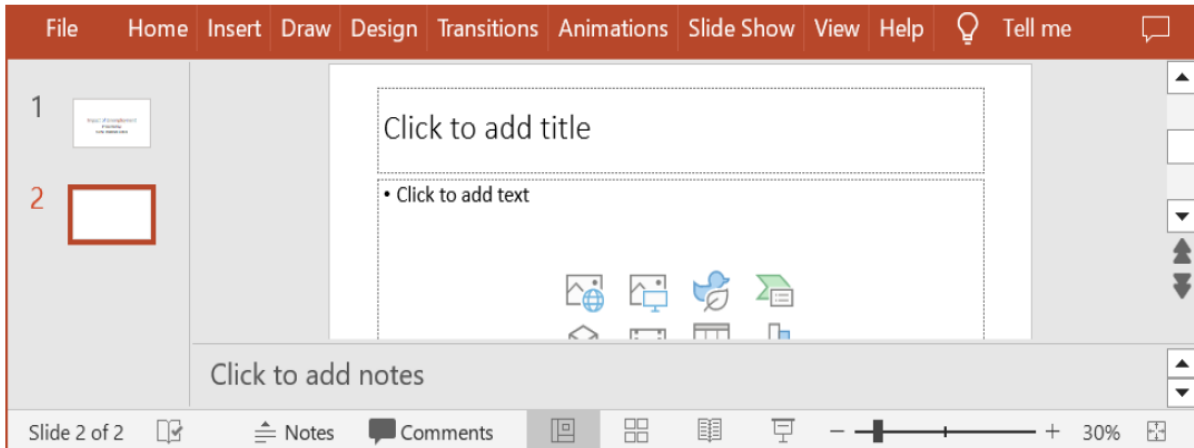
5. Point and click on the tiny arrow pointing down near the New Slide button to display a list of slide layouts. See **Fig. 2-9** below.

**Fig. 2-9:** *Shows a variety of slide layouts*

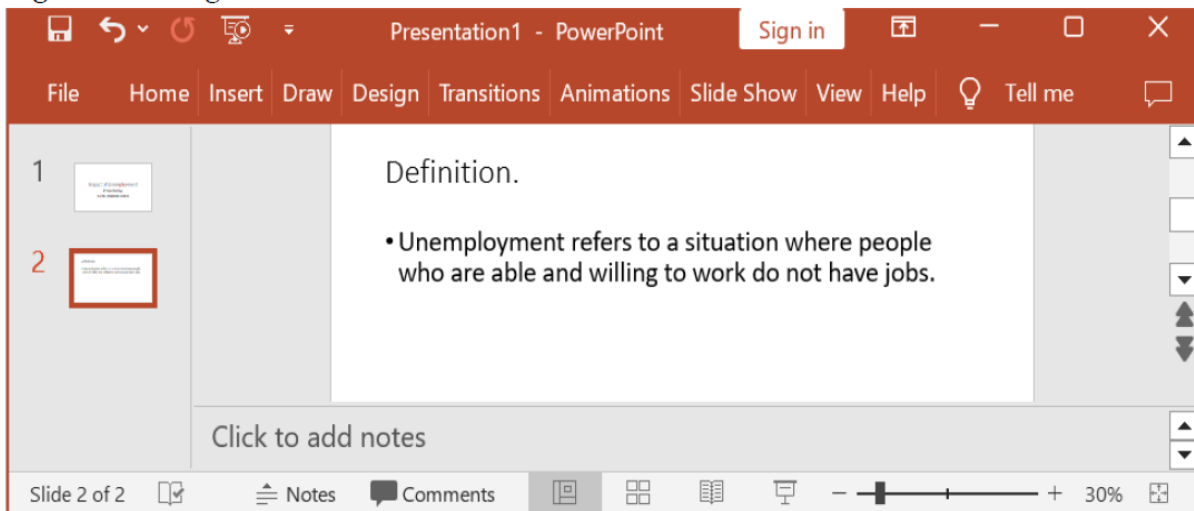


6. Use your mouse and select by clicking **Title and Content** slide layout as seen in **Fig. 2-9** above. You will see a new slide ready to edit. See **Fig. 2-10** below.
7. In the new slide, establish a sub-title to place in the **Click to add title** place holder, say: **Definition**, and the lower place holder in the **Click to add text**, you can put a very brief definition of **Unemployment**. See **Fig. 2-11** below.
8. Insert another slide, and this time select the **Two Content** slide layout. You do so because you may need to include illustrative image(s). See **Fig. 2-12** below.

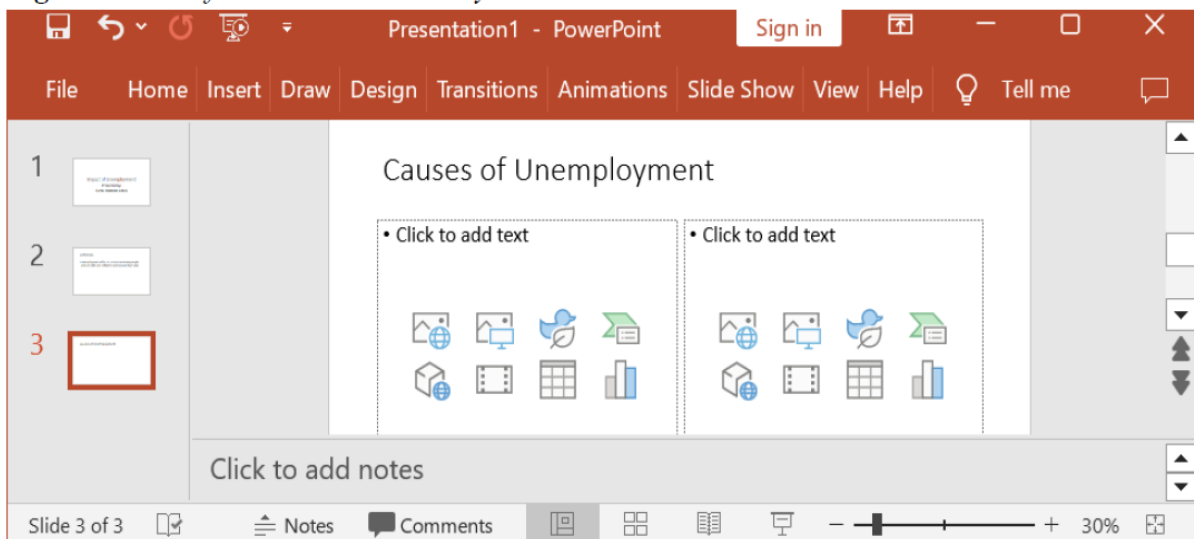
**Fig. 2-10:** Shows a new inserted slide ready for editing.



**Fig. 2-11:** Adding contents to the slide.



**Fig. 2-12:** Use of Two Content slide layout



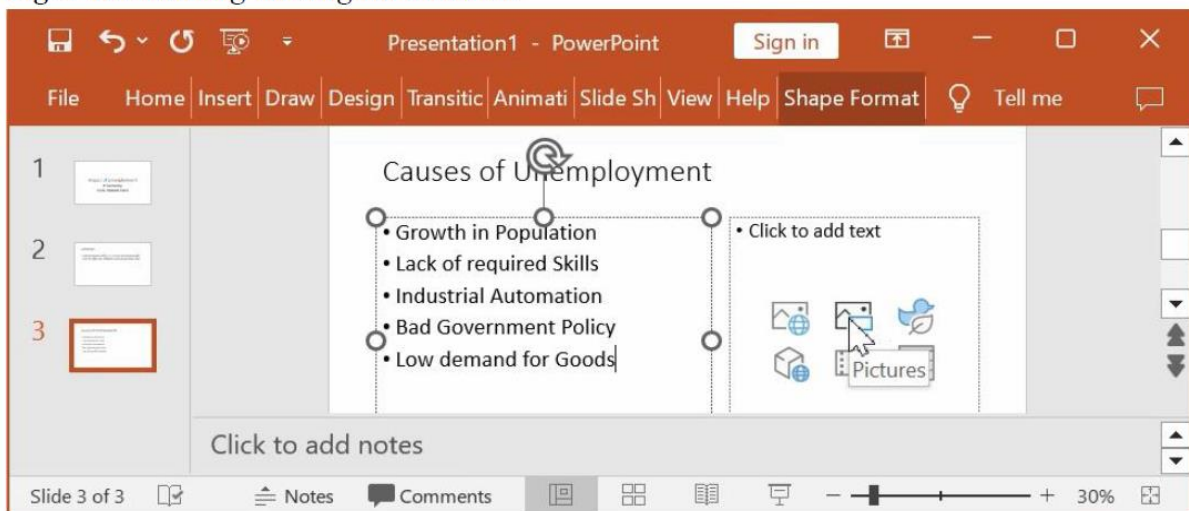
**Note:**

- In Fig. 2-12 above shows the upper place holder, which can be used for the sub-title and the two lower place holders for the contents.
- You can use one lower place holder for the text content and the other for the image or video clip content. It doesn't matter which one you use for the text and the other for the image/video.

**Inserting an Image**

To make your presentation more powerful and attention catching, you need to include a few images into your presentation. The images must be both illustrative and matching the content being presented.

**Fig. 2-13:** *Inserting an image in the slide.*



9. After entering text, move the mouse pointer at the icon where it displays Pictures and click it once. See Fig. 2-13 above. The new dialog box Insert Picture will be displayed as seen in Fig. 2-14 below.
10. In Fig. 2-14 below there are two default folders, i.e. **Camera Roll** and **Saved Pictures**. Double click the **Saved Pictures** folder. Your work should be like the one in Fig. 2-15 below.

**Note:**

- The pictures in **Saved Pictures folder** are not always there in every computer. You need to place them there. Collect the appropriate pictures and save them in that folder.
  - You can occupy **Camera Roll** folder with the pictures you take using your webcam on your computer.
11. Point and click the third picture (showing a robotic image) and then click **Insert**. Your work should look like the one in Fig. 2-16 below.

Fig. 2-14: The Insert Picture Dialog box

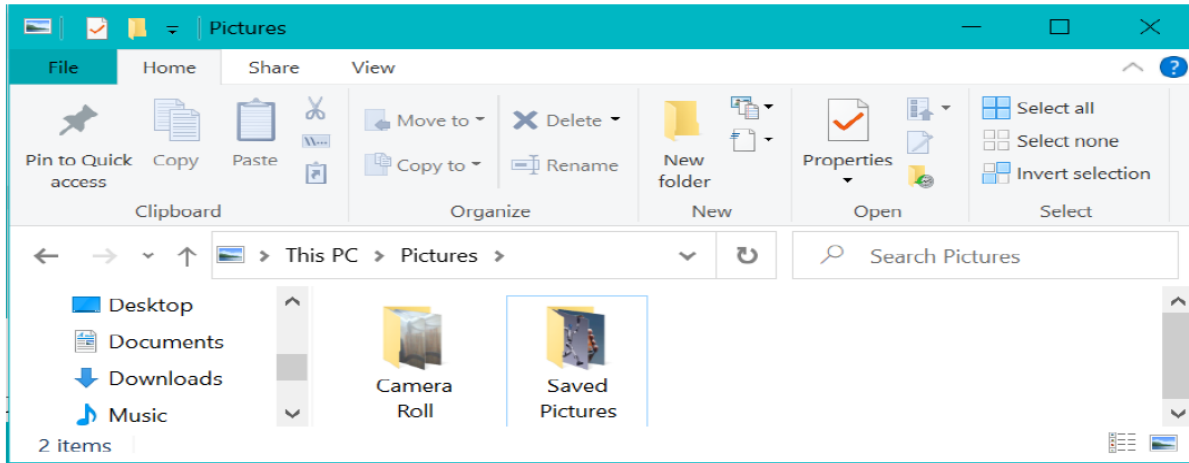


Fig. 2-15: Navigating to other folders with relevant images

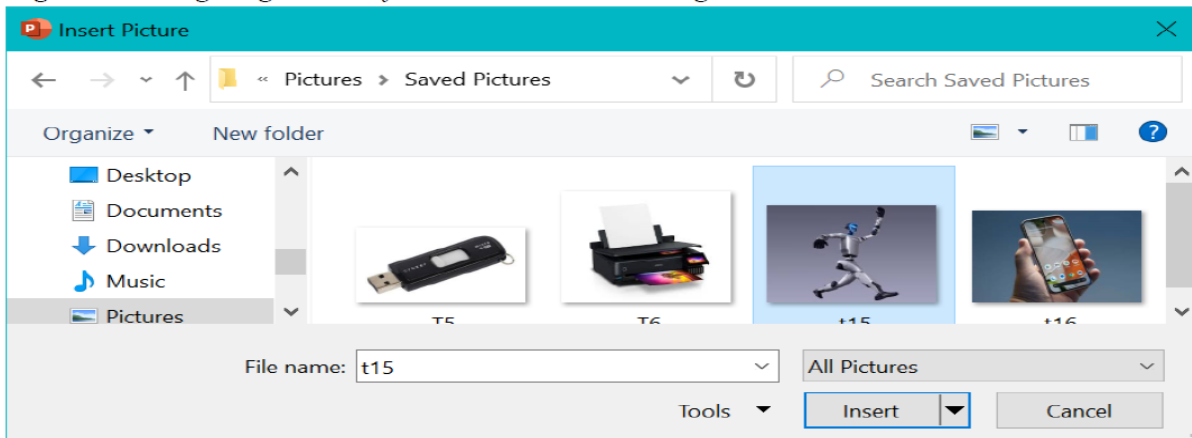
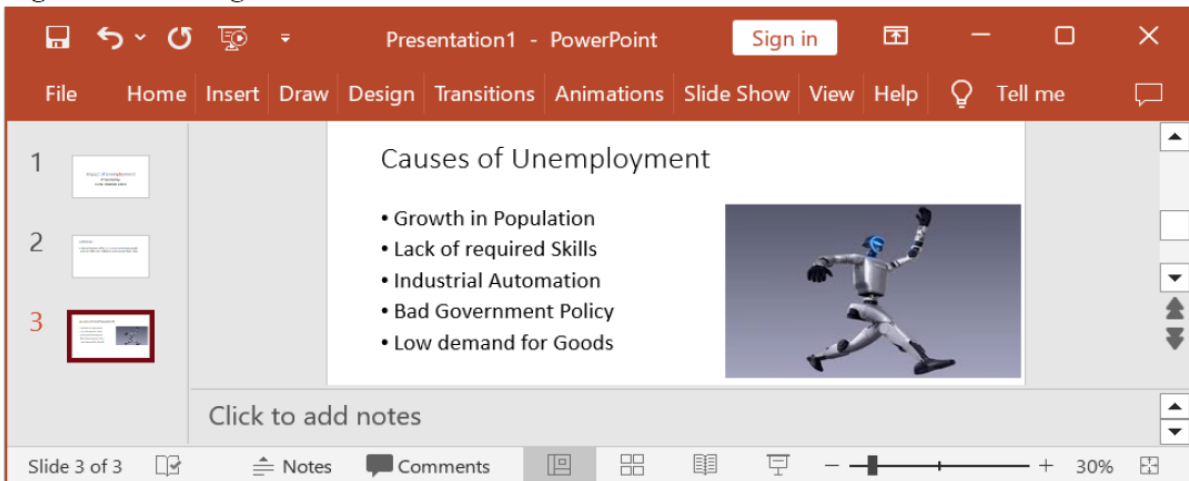


Fig. 2-16: Selecting Pictures



# THE TOPIC CONTINUES

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## TOPIC THREE

### Computer Hardware

In this chapter, we shall examine in details the hardware tools that we use and their categories. To be competent in ICT, it is quite important to understand which hardware tool you need to implement particular kind of task.

- A **computer** is an electronic device processes input data according to a given instruction, stores the processed data and give out information to the user.
- **Computer hardware** refers to all physical components of a computer that can be touched and felt e.g. hard disk, monitor, keyboard, etc.
- **Computer peripherals** refer to all external devices that can be connected to the computer to add functionalities, such as input devices, output devices, or storage devices.

#### 3.1. Hardware Classification

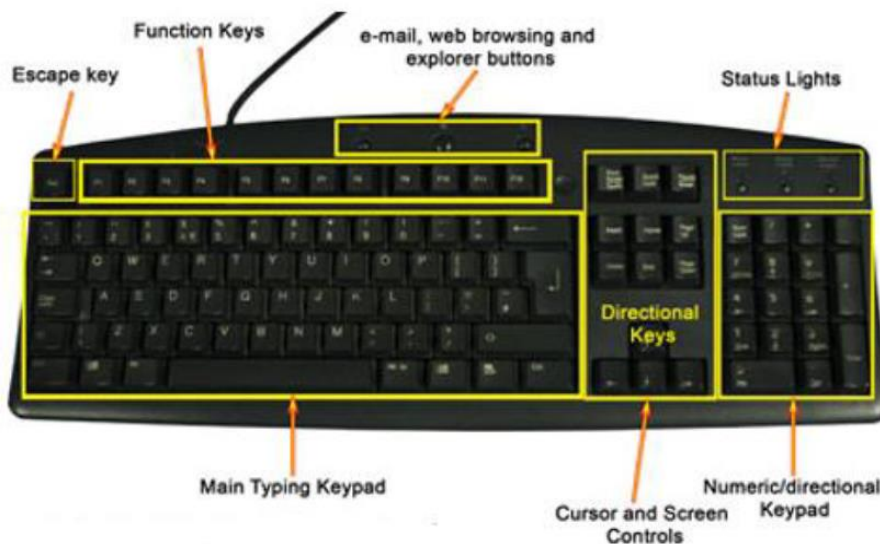
Computer hardware can be categorized into several functional components which include input devices, processing tools, storage devices, output devices, and communication channels.

##### 3.1.1. Input Devices

These are all devices that aid computer users to interact or enter data into the computer for processing.

Input devices are classified in the following five common categories:

- Keyboard entry
- Pointing devices
- Scanning devices
- Biometric devices
- Audio Input devices
- Video Input devices



### 3.1.1.1. Computer Keyboard

A computer keyboard is an input device that enables computer users to type letters, numbers, and other symbols into the computer.

The computer keyboard is having a combination of buttons which are grouped into sections as:

- Typewriter area
- Function keys
- Numeric keypad
- Cursor keys
- Special purpose keys

#### The Typewriter area

The typewriter area consists of key buttons that are labeled **A** through **Z**, **0** through **9** and other special character symbols that are used to construct document.

#### The Function keys

The function keys are keyboard keys labeled **F1** through **F12** used as a shortcut means to issue commands. What function each key performs depends on the software program you are using. If you master a number of function keys it can save you a great deal of time during computer operation.

#### Numeric keypad

Numeric keypad combines cursor keys, number labeled buttons, and other special purpose keys. When you turn the “**num lock**” key off your microcomputer system assumes that these keys will be used for cursor movement. When the “**Num lock**” key is on, you can use the number keys.

#### The Cursor keys

Cursor movement keys are used to move the cursor around the screen. The **cursor** is the symbol on the display screen that shows where the text character that is input will be positioned. Cursor keys are also known as control keys, navigation keys, or screen control keys.

#### The Special Purpose keys

These are keys which don't produce a print but support the performance of other key buttons to produce a print or used in combination of other key buttons to issue commands. There are a variety of key buttons and these include:

##### a) Caps lock key

- Caps lock key is used to lock characters ‘**A**’ through ‘**Z**’ to uppercase position when pressed once.
- To release the uppercase mode, you press the Caps lock key once again.
- The Caps lock light comes “on” when locked in uppercase, and “off” when in lowercase.

##### b) Shift Key

- Shift key is used to shift the alphabetic keys, ‘**A**’ through ‘**Z**’ to uppercase mode when the caps lock key is off and vice-versa.
- For all the other keys in the typewriter area, holding the shift key, down cases the characters shown at the upper portion to be obtained.
- The caps lock key does not affect these keys.

- c) **Num lock key**
  - Num lock key is used to lock in the numbers when turned “on”, so that the numeric keypad can only be used to type numeric characters.
  - When the Num lock is “off”, you can only use the arrow keys for cursor movements.
- d) **Enter (Return) key**
  - It is used to confirm to the computer whatever is typed i.e. when a command is issued it can only be executed after pressing the return key.
  - In other operations like word processing, the Return key helps in starting a new paragraph by striking the Enter key once.
- e) **Back space key**
  - It is used to erase the characters to the left creating spaces as it does so. In other words, it erases the typed text left wards.
- f) **Delete Key**
  - The delete key is used to erase the typed text right wards.
- g) **Escape (Esc) key**
  - It is the key at the left top corner of the keyboard used to cancel or close an operation in a computer.
- h) **Insert (Ins) key**
  - The insert key, when pressed once, is used to switch between character insert mode to character overwriting mode and vice versa.
  - The Insert key does not work the way it is intended when used in some applications.
- i) **Tab key**
  - The tab key (tabulator or tabular key) is used to organize text in columns or tabular format when used in word processing programs.

### 3.1.1.2. Keyboard Shortcuts

Keyboard shortcuts are combinations of keys that perform specific actions in software, saving time and effort.

Common Keyboard Shortcuts:

- **Ctrl+C (Copy):** Duplicates selected text or files.
- **Ctrl+V (Paste):** Inserts copied or cut content.
- **Ctrl+X (Cut):** Removes selected text or files to the clipboard.
- **Ctrl+Z (Undo):** Reverts the last action.
- **Ctrl+A (Select All):** Highlights all text or items in a window.
- **Ctrl+S (Save):** Saves the current document or file.
- **Ctrl+N (New):** Creates a new document or file.
- **Ctrl+O (Open):** Opens an existing document or file.
- **Ctrl+P (Print):** Prints the current document or file.

- **Ctrl+B (Bold):** Applies bold formatting to text.
- **Ctrl+I (Italic):** Applies italic formatting to text.
- **Ctrl+U (Underline):** Applies underline formatting to text.
- **Alt+Tab:** Switches between open applications.
- **Windows Key + L:** Locks the computer.
- **Windows Key + D:** Shows the desktop.
- **Ctrl+Shift+Esc:** Opens Task Manager.
- **Windows Key + Print Screen:** Takes a screenshot.

### Activity 3-1

Ann Mada and you are advanced level students on vacation. During this time, you are attending an interview expecting to secure a job as typists in one of the publishing companies. The company is looking for the highly skilled typists, and manager of the company is insisting on a worker with the notable speed (50 words per minutes) and exhibiting high level of precision.

#### Task

- In the interviews, the manager wants to find out about your knowledge of keyboard layout. Write down explaining to the manager what is keyboard layout and outline all the keyboard sections.
- The manager is tasking you to explain how you will alternate between lower- and upper-case characters during typing. Identify the key button that you will use and explain how it will function.
- In the interview, they are tasking you to explain whether you know about the shift key button. Write down explaining how the shift key button will function for you.
- Your potential manager wants to find out whether you are competent enough with the use of shortcut keys. Identify some shortcut keys and state how they will be of help for you.

#### 3.1.1.3. Pointing Devices

- A **pointing device** is an input interface that allows a user to input spatial (i.e., continuous and multi-dimensional) data to a computer.
- Pointing devices include mice, trackballs, joysticks, touch screens, light pens, digitizing tablets, touchpads, and pen computers.

#### 3.1.1.3. Pointing Devices

- A **pointing device** is an input interface that allows a user to input spatial (i.e., continuous and multi-dimensional) data to a computer.
- Pointing devices include mice, trackballs, joysticks, touch screens, light pens, digitizing tablets, touchpads, and pen computers.

#### Mouse:

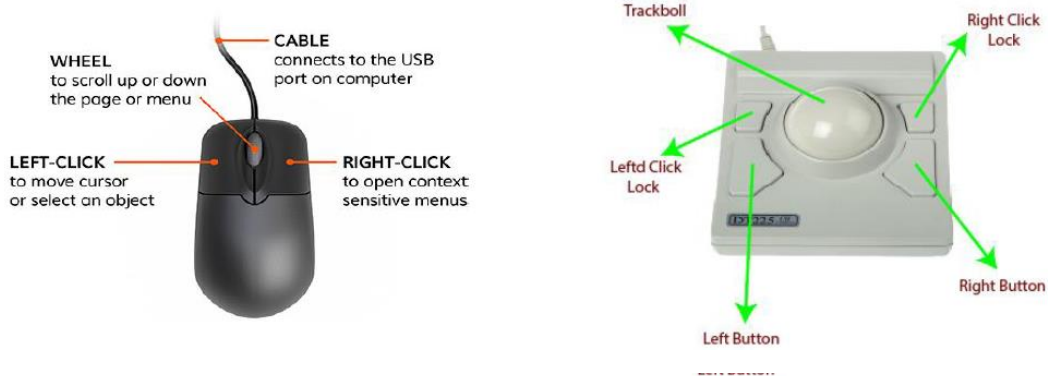
- A **mouse** is a pointing device that functions by detecting two-dimensional motion relative to its supporting surface.
- A mouse is a device that is rolled about on the desktop and directs a pointer on the computer's display screen.

- On the bottom side of the mouse is a ball (trackball) that translates the mouse movement into digital signals.
- On the top side are one, two, or three buttons.
- Depending on the software, these buttons are used for such functions as clicking, dragging, and dropping.

### Trackball

- A trackball is a movable ball, on top of the stationary device, that is rotated with the fingers or palm of the hand.
- Trackballs look like the mouse turned upside down.

### Labeled Diagram of Computer mouse and trackball



### Joystick:

- A **joystick** is an input device consisting of a stick that pivots on a base and reports its angle or direction to the device it is controlling.
- Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer.

### Touch Screens

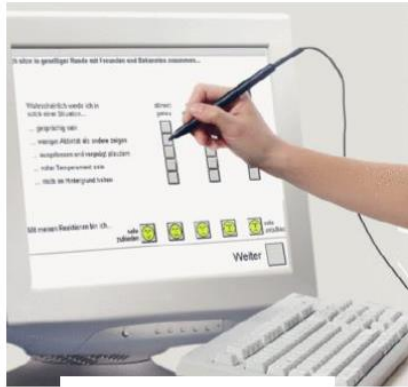
- Touch screen is a video display screen that has been sensitized to receive input from the touch of a finger.
- Touch screens are mostly used in automated teller machines and tourist directories in airports.



### Light pens

- A light pen is a light sensitive stylus, or pen-like device, connected by a wire to the computer terminal.
- The user brings a light pen to the desired point on the display screen and presses a pen button, which identifies that screen location to the computer.

- Light pens are mostly used by engineers, graphic designers and illustrators.



*Light pen*



*Digitizing Tablet*



*Touch pad*



*Image Scanner*

### **Touch pad.**

- A touch pad is a surface that is sensitive to pressure and motion that causes the pointer on the screen move in the same direction when you move your finger across the pad.

#### **3.1.1.4. Scanning Devices**

- Scanning devices translate images on text, drawings, photos, and the like directly into digital form that the computer can use.
- The images can then be processed by a computer, displayed on the screen, stored on the storage device, or communicated to another computer.
- The following are good examples of scanning devices:
  - ❖ **Image scanner:** - It captures images from printed pages of text, pictures, handwritten text and drawings into the computer.
  - ❖ **Barcode scanner:** - Is a hand-held input device used to capture and read information contained in a barcode. The barcode scanner is also called barcode reader, Point of Sale (POS) scanner, or Price scanner.
  - ❖ **Optical Character Recognition (OCR):** - Is an electronic device that can convert images of typed or handwritten text into machine encoded text.
  - ❖ **Optical Mark Recognition (OMR):** - Is an electronic input device that collect data from people by identifying markings on paper.
  - ❖ **Magnetic Ink Character Recognition (MICR):** - Is an input device that is used by banks to recognize string of characters at the bottom of the check to test the originality and the source bank of the check.

# THE TOPIC CONTINUES

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# TOPIC FOUR

## Computer Software

### 4.1. Software Identification

- **Software** is a set of instructions or programs that tells the hardware parts on what to do and how to do it.
- **Software** consists of computer programs that control the workings of the computer hardware. Without software, the computer hardware can do nothing.
- Computer software is divided into two major parts:
  - i) Systems software
  - ii) Applications software

#### 4.1.1. Systems Software

- It is a set of programs that support the computer systems by coordinating the activities of the hardware and the applications.
- System software is a computer software designed to operate the computer hardware, to provide basic functionality, and to provide a platform for running application software.
- System software includes device drivers, operating systems, and utility programs

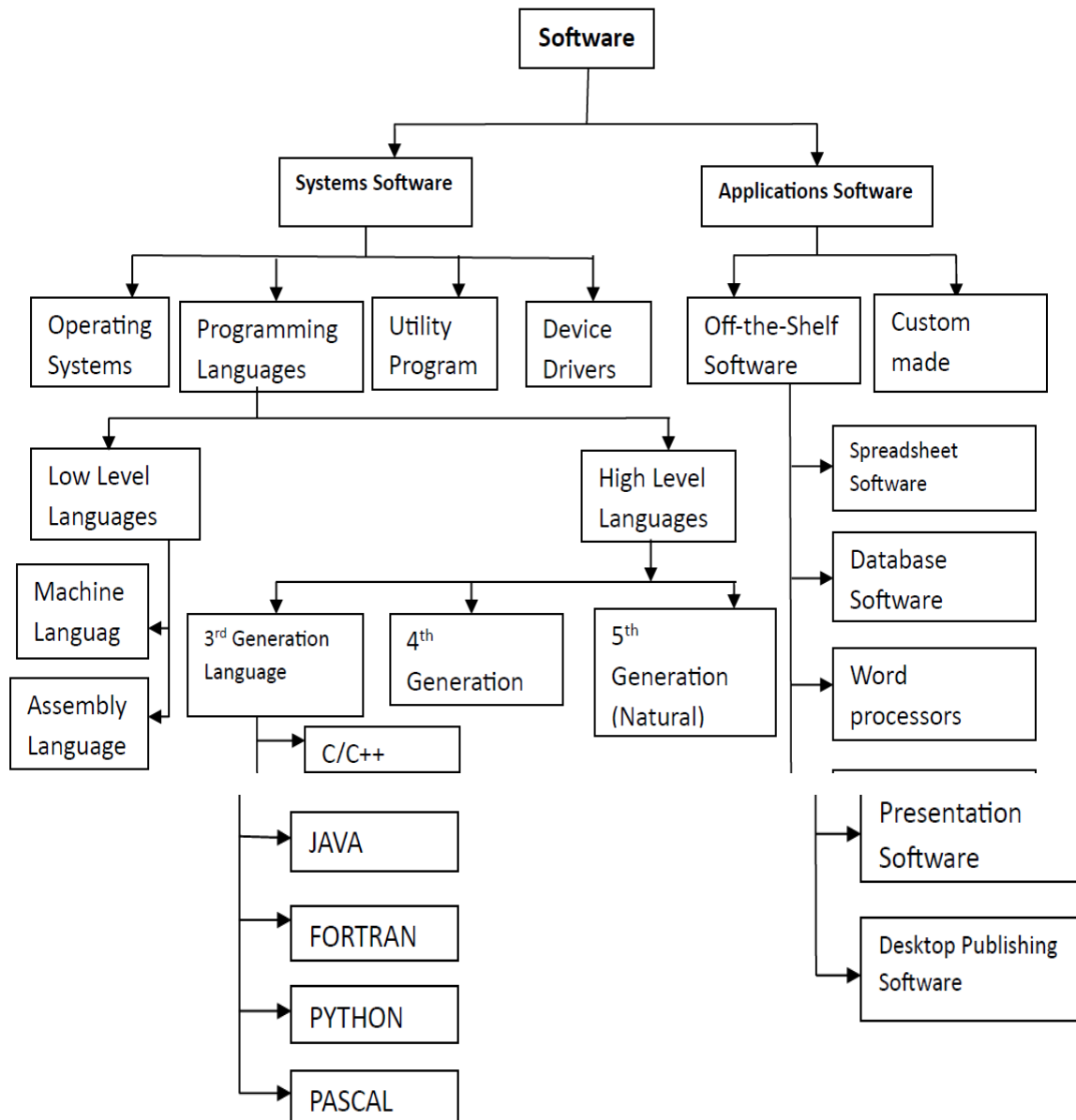
##### 4.1.1.1. Operating Systems

- An **operating system (OS)** is a collection of software that manages computer hardware resources and provides common services for application programs.
- The operating system is a vital component of the system software in a computer system. Application programs usually require an operating system to function.

##### 4.1.1.2. Functions of operating system

- i) **File Management:** Allows the user to create, copy, move, delete, or rename a file.
- ii) **Manage system memory** to control how memory is accessed and used.
- iii) **Manage processing tasks:** - Tasks can be handled like enabling the user to run more than one application at the same time. (Multitasking).
- iv) **Manage file tracking:** - It can track where each file is stored and where it is located.
- v) **Security Management:** - Controls access to system resources like by providing functions such as password protection.
- vi) **Provide the user interface:** - It enables the user to interact with the computer. For example, Windows Operating Systems display various icons on screen which are clicked by users.
- vii) **Device Management:** - Allows the user to utilize the resources such as printer, keyboard, external storages, as it monitors their operations.

#### 4.1.1.3. Software Structure Chart



#### 4.1.1.4. Types of Operating Systems

Operating systems (OS) are categorized based on their design, functionality, and the type of devices they manage. Here are the main **types of operating systems**:

##### Batch Operating System

- This was a kind of the earliest operating systems that used to executes batches of jobs with minimal user interaction. Used with early mainframes.
- **Example:** IBM OS/360.

- **Point of Sale (POS) Software:** - Used in shops for monitoring sales and inventory.
- **ATM software:** - Used to operate bank ATM machines to manage clients' transactions.
- **Hospital Management Systems:** - used for handling patients, billing and recording.
- **Flight Booking Systems:** - Used by airlines and agents.

#### 4.1.2.5. Open-Source Software

Open-Source software is a software whose source code is freely available for anyone to view, modify and distribute. Examples of open-source software include:

- **Mozilla Firefox** for web browsing
- **LibreOffice** – an office suite.
- **GIMP** – an image editing software.
- **Audacity** – for audio editing.

#### 4.1.2.6. Proprietary Software

Proprietary Software is software that is owned by a company or individual and has restricted access to its source code.

The key features in proprietary software include:

- Microsoft Windows operating system.
- Microsoft Office – productivity suite
- Adobe Photoshop – for graphic design.
- AutoCAD – design software.

#### Activity 4-2

You have been appointed as a marketing officer in one of the local software firms. Your work is to visit educators in various institutions to make them aware of the school management system that your company wishes to market and distribute. During your marketing schedules, you find out that some other institutions have started using other software like spreadsheets and you need to convince them in such a way that they can be persuaded to take the new system.

#### Task

- Write down all the services that the school management system developed by your company will have to offer to any of the educational institutions.
- Write down the necessary hardware tools that will be needed to make the school management system operational.

#### 4.1.3. User Interface (UI)

- A **User Interface (UI)** is the point of interaction between the user and a computer system, application, or device. It includes everything the user sees and interacts with to operate the system effectively.
- To use any software or operate any ICT tools you must be familiar with the user interface. Every software developed or ICT hardware tool manufactured must be accompanied with its appropriate user interface.

#### Types of User Interfaces

There are several types of user interfaces that help us operate the ICT tools and deployed software. These user interfaces include:

##### 1. Graphical User Interface (GUI)

Is a type of user interface that allows users to interact with electronic devices through visual elements like windows, icons, menus, buttons, and pointers.

Key features of Graphical User Interface include:

- Using windows, icons, buttons, menus, and pointers to issue commands.
- User-friendly and visually rich.
- Multitasking where it allows opening and switching between multiple applications.
- Using drag and drop operations where you can move files and objects easily.
- **Examples:** Windows OS, macOS, Android, iOS

##### 2. Command Line Interface (CLI)

Is a type of user interface where users interact with the computer by typing text-based commands.

Key features of command line interface include:

- Requires text-based commands (e.g. dir, cd, copy)
- Fast for advanced users, but hard for beginners.
- Low resource usage such as processor time or RAM size
- **Examples:** macOS Terminal, Windows Command Prompt, Linux Shell

The major applications of Command Line Interface (CLI) include:

- **System administration:** - Managing files and folders, users, processes and system configurations.
- **Software Installation and updates:** - Using specialized commands that direct the installation of software packages.
- **Networking tasks:** - Configuring IP addresses and checking connections.
- **Programming and development:** - writing codes, running scripts, and compiling codes.
- **File management:** - Creating, deleting, copying and moving files.
- **Accessing remote servers:** - Using commands to log into remote machines.
- **Troubleshooting:** - Diagnosing system or software issues quickly using logs and diagnostic commands.

### 3. Menu-Driven Interface

Is a user interface where options are presented in the form of a list or menu, and users choose by selecting from those options.

Key features include:

- Easy to use and no need to memorize commands.
- Options are clearly listed.
- Can use buttons, arrows, or numbers for selection.
- Slower than CLI for advanced users.

The major applications of menu-driven interface include:

- Banking systems (withdraw, check balance, deposit)
- Mobile phone settings menus while performing transactions.
- Customer service systems such as mobile money customer care.
- Setup options during software installations.
- Point of Sale (POS) systems.

### 4. Touch User Interface

This is a kind of an interface that allows users to interact with a device by touching the screen directly using a tip of a finger or a stylus.

Key features of touch user interface (TUI) include:

- No physical keyboard or mouse needed.
- Gestures like tap, swipe, pinch, zoom are used.
- Fast and intuitive (easy to adopt) interaction.
- Ideal for small and portable devices.

The applications of Touch User Interface can be in:

- **Smartphones & Tablets:** - For navigation, typing and operating mobile apps.
- **Automatic Teller Machines (ATMs):** - For touching on screen display to select banking options.
- **Point of Sale (POS) systems:** - In shops and supermarkets.
- **Smart home devices:** - Operating thermostats, and light control.
- **Touch screen laptops:** - For easy navigation and drawing.
- **Self-service kiosks:** - Used in malls, airports, and restaurants.

### 5. Voice User Interface (VUI)

Voice User Interface allows users to interact with devices using spoken commands.

# THE TOPIC CONTINUES

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## TOPIC FIVE

### Computer Word Processing

#### 5.1. Working with Word Processing Software

If there is a large computing demand, always we must think about word processing. In our homes, businesses, or in our formal working environment we create and keep documents using word processing application.

##### 5.1.1. Definition

Word processing is a program that can be used to create, edit, format, store, and print a document that contains text and graphics. A text document is anything that can be keyed in, such as a letter.

There are several examples of word processing programs used today:

- |                              |                       |
|------------------------------|-----------------------|
| i) Microsoft word            | vii) La Text Edit     |
| ii) Google Docs              | viii) LyX             |
| iii) LibreOffice Writer      | ix) Corel WordPerfect |
| iv) Apache OpenOffice Writer | x) WordStar           |
| v) Apple Pages               | xi) Lotus WordPro.    |
| vi) AbiWord                  |                       |

#### Basic operations of word processing include:

- i) **Creation:** Involves entering text or numbers, inserting graphics, and performing other tasks using an input device such as a keyboard and a mouse.
- ii) **Editing:** Making changes to the document to fix errors or to improve its content, for example deleting a sentence, correcting a misspelled name, copying or moving a paragraph.
- iii) **Formatting:** To adjust the appearance of the document to make it look appropriate and attractive. E.g. bolding, aligning text, or changing font size.
- iv) **Storing (Saving):** Is the process of copying a document from the computer memory to a storage medium such as a floppy disk or hard disk.
- v) **Printing:** Is the producing of the document on paper, using a printer connected to the computer?

#### Popular features of word processing:

- i) **Word wrap:** This feature allows a user to type continuously without pressing the Enter key at the end of the line.
- ii) **Spell Checker:** Allows a user to check the spelling errors of the whole document and suggest the corrections.
- iii) **Grammar Checker:** Reports grammatical errors and suggests ways to correct them.
- iv) **Thesaurus:** Suggests the alternative words with same meaning (i.e. synonyms) for use in the document.
- v) **Find and Search:** Allows a user to locate all occurrences of a particular character, word or phrase existing in a document.
- vi) **Mail merge:** Create form letters, mailing labels, and envelopes and it is used when letters of the same contents have to be sent to different individuals.
- vii) **Automatic page numbering:** Numbers the pages automatically in a document.

- viii) **Tables:** Allows a user to organize information into rows and columns.
- ix) **Multicolumn:** Arranges text in two or more columns that look similar to a newspaper or magazine.
- x) **Clip art gallery:** Allows a user to insert drawings, diagrams, and photographs into a document.
- xi) **Template:** Allows a user to create documents with pre-defined format.
- xii) **Printing:** Allows a user to produce a document on paper (Hardcopy)

### 5.1.2. Starting Word Processing

Much as one can use any of the above listed examples of word processing software, in this book, all of the illustrations of using word are going to be made in **Microsoft Word**. In this case, you must have your Microsoft Word application installed, preferably *Office 2016*, *Office 2019*, *Office 2021*, or any other higher version.

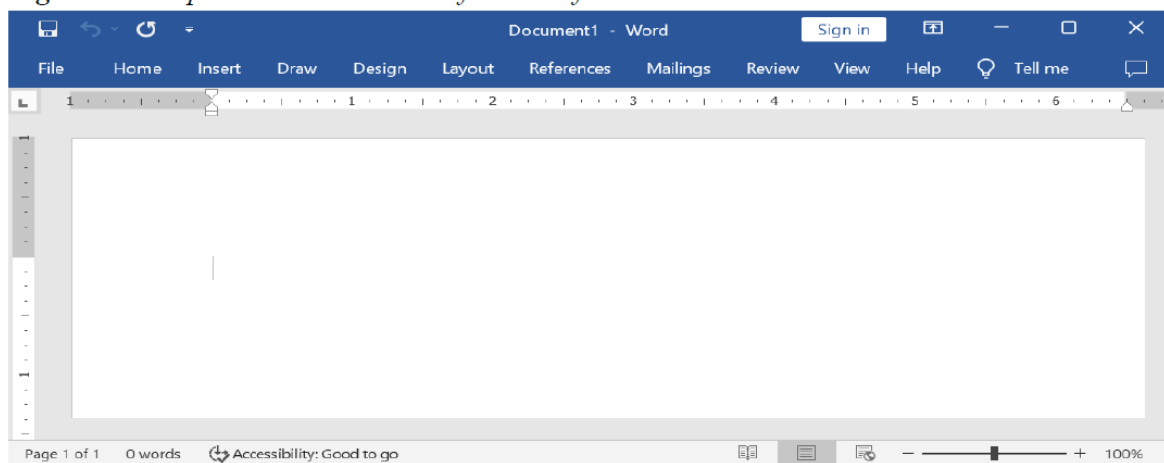
#### Steps

1. To start Microsoft Word, if you are using *Windows 7* on your PC you can point and click the Start button on your left bottom corner of your desktop screen.
2. From the display menu, you move the pointer and select **Microsoft Office 2019**, if that is the version installed on your computer. It may be **Office 2013** or **Office 2016** instead.
3. After selecting **Microsoft Office 2019**, several other Microsoft Office applications will be displayed. You can point and select **Microsoft Word 2019**. The new blank document will be opened just like the one seen in **Fig. 5-1** below.

#### Steps

1. To start Microsoft Word, if you are using *Windows 7* on your PC you can point and click the Start button on your left bottom corner of your desktop screen.
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3. After selecting **Microsoft Office 2019**, several other Microsoft Office applications will be displayed. You can point and select **Microsoft Word 2019**. The new blank document will be opened just like the one seen in **Fig. 5-1** below.

**Fig. 5-1:** The open Blank Document of Microsoft Word



### 5.1.3. Creating New Document

The major activities in word processing involves creating and processing textual documents. Textual documents are a composition of words made of combination of characters (letters, numbers, and other symbols).

To have a word document entered into the computer in first place, we need the computer keyboard as the primary input device.

Users of word processing should have a notable dexterity in the use of keyboard to enter hand written information or information in any other format into the computer.

While using the keyboard, you should be familiar with keyboard layout, alternating between lowercase and uppercase characters, use of shortcut keys, erasing typed text and perhaps, enforcing symbols.

#### Activity 5-1

In a group of not more than five (5) students, you will prepare a handwritten document about any topic of your choice in form of an essay. The document should be not less than ten pages in a handwritten format. You should have the general title about the topic.

#### Task

- (a) To practice the typing skills, open Microsoft Word blank document as seen in **Fig.5-1** above and start typing the composed document in your group (preferably, type it individually).
- (b) Save the document typed before shutting down your computer even if you have not completed typing the entire handwritten work. Use **Your Name – Essay** as your file name.

#### Note:

- When you type any document, like the one in **Activity 5-1** above, remember to space the words using the space bar key on your keyboard. Don't press the space bar key more than once!
- Use the **Enter** key button by pressing it once every after the end of a paragraph to start a new one.
- When you are typing, do not use the **Enter** key button to start a new line, because the word processing programs have in built feature for automatically wrapping words at every end of the line.
- Words that are misspelt or not available in your word processing dictionary will always be underlined with a wavy red line.
- Microsoft Word can also detect poorly expressed sentences or grammatical errors by using double green or blue straight underlines.
- Users can always use spell and grammar checkers to correct the misspelt words or poorly expressed sentences in their document.
- To improve on your typing speed, you should practice to type large documents and there should be no one reading for you while you are typing!

### 5.1.6. Document Formatting

- Document formatting refers to the way text and other elements are arranged and presented in a document to improve readability and appearance.
- The key elements in document formatting include adjusting Font style and size, Text alignment, Line spacing, Paragraph spacing, Margins, Indentation, Bullets and numbering, Page Numbers and header/footer, Bold, italic, underline, etc.

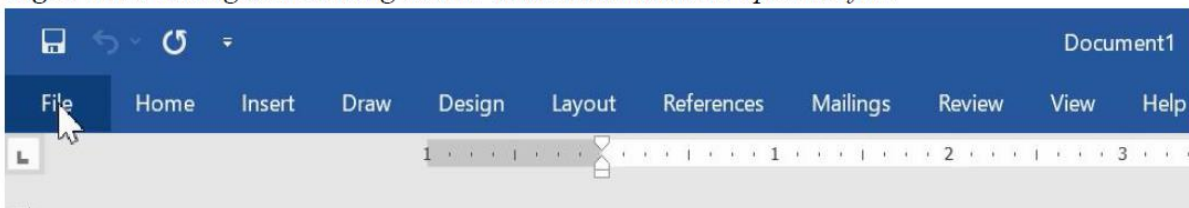
#### Activity 5-2

In this activity, you will open the file you saved in the previous assignment - **Activity 5-1**. You can also open the file provided in this book available on your **DVD-R** as **Activity 5-2**. Copy and rename this file using your full name. In this activity the work is opened and saved as **KICHUI SHADRACK ENOCK – ESSAY**.

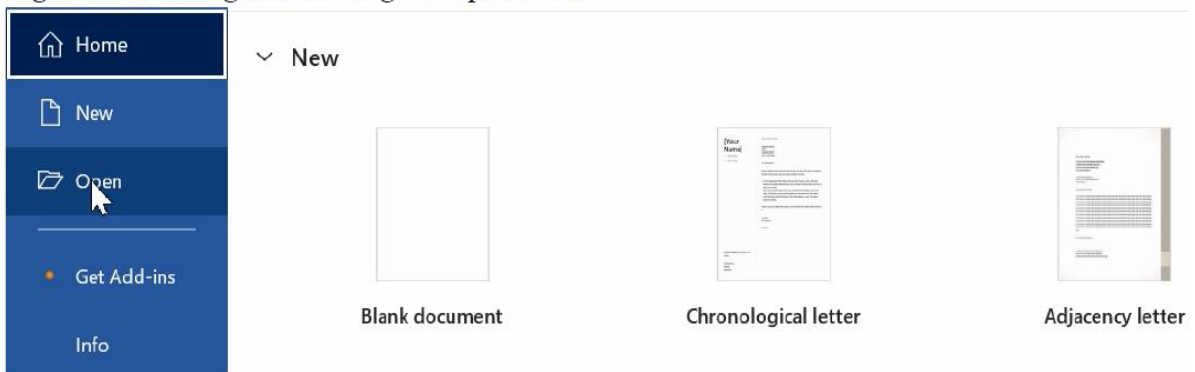
In a group or individually, you will follow the steps below to format your document:

1. Start the MS-Word document as explained in the previous steps. A blank word file will open in a similar way as the one we see in **Fig. 5-1** above.
2. In the menu bar, point and click **File** once. See **Fig. 5-14** below. In the list of displayed options move your mouse and select Open as seen in **Fig. 5-15** below.

**Fig. 5-14:** Pointing and clicking at File in the main menu to open the file.

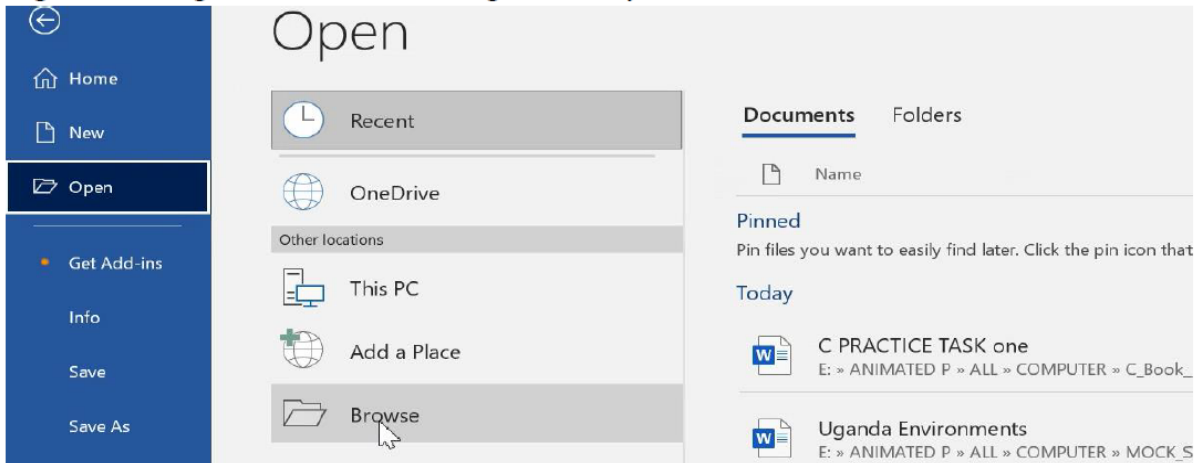


**Fig. 5-15:** Pointing and clicking the Open button.

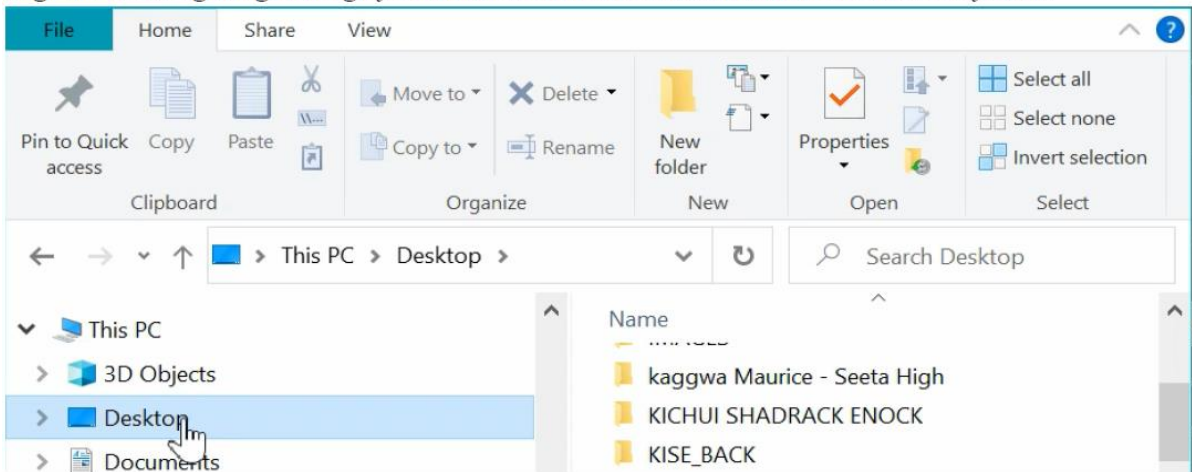


3. Point and click **Browse** button to access the folder structures within your storage as seen in **Fig 5-16** below. The folder structure will open showing you several options to select. See the **Fig. 5-17** below.

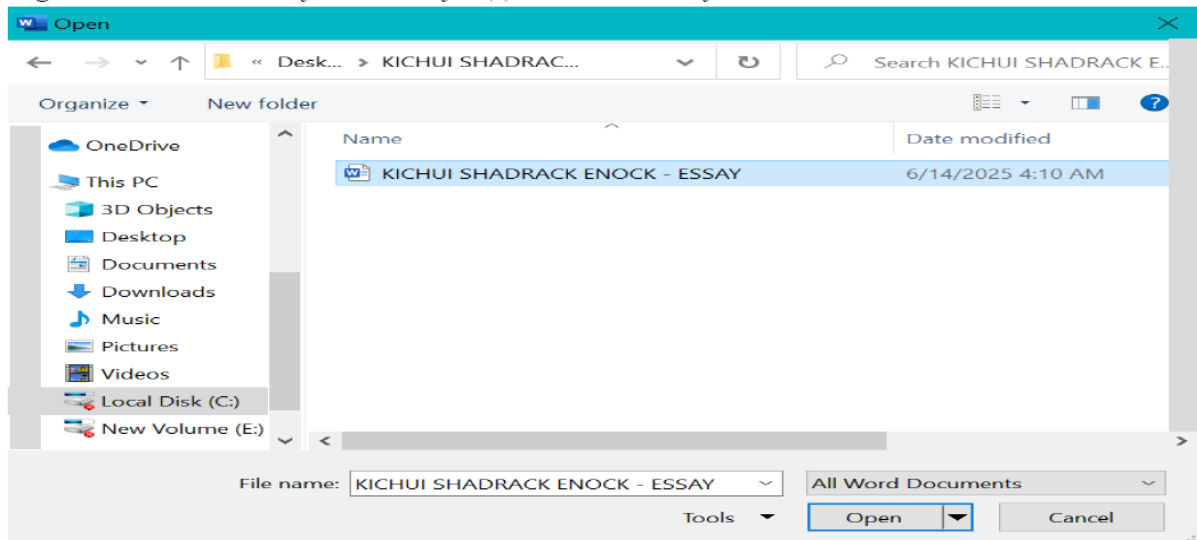
**Fig. 5-16:** Using **Browse** button to navigate across folder structure.



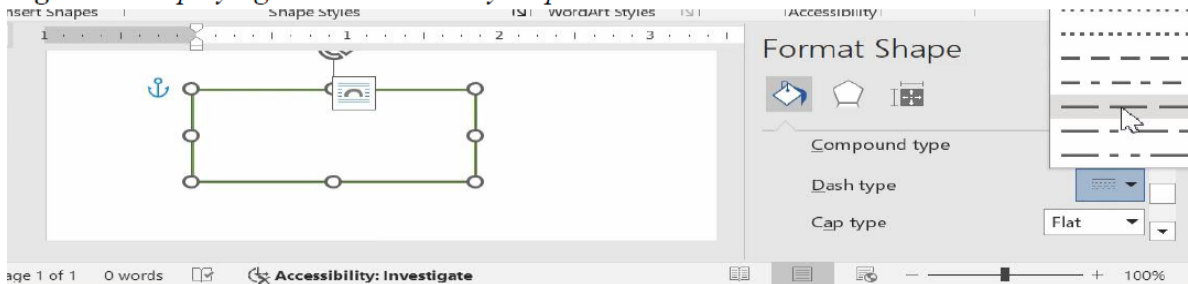
**Fig. 5-17:** Navigating through folders to access **KICHUI SHADRACK ENOCK** folder.



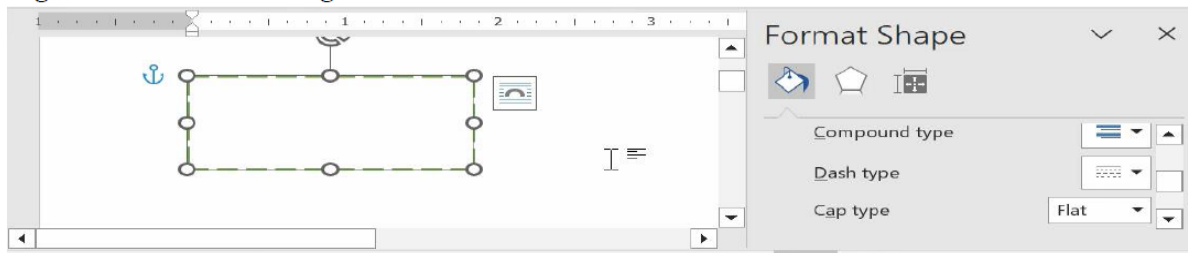
**Fig. 5-18:** Shows a list of document file(s) saved within a folder.



**Fig. 5-87:** *Displaying the dashed line style options*



**Fig. 5-88:** *Shows a rectangle with dashed lines*



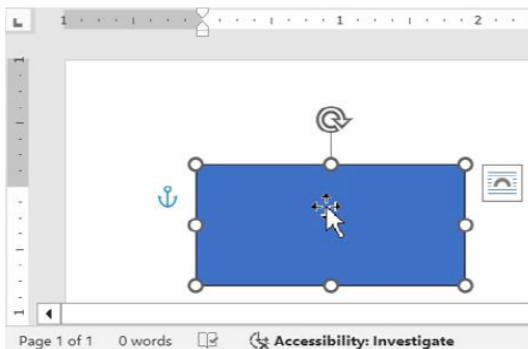
### Adding Text on Shapes

All shapes we insert we can add text on them as a caption or creating a structured information that is to be organized in a hierarchical manner.

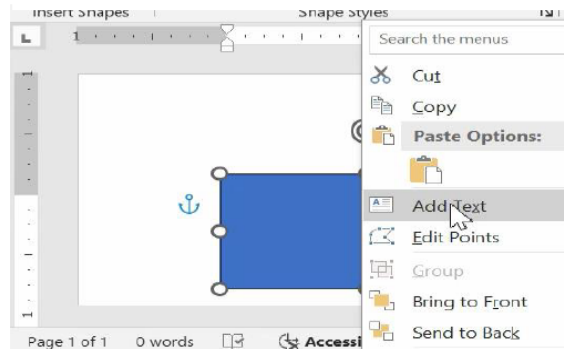
To add text in your shapes, follow these steps:

1. Insert a shape of your choice following the previous procedures. Your MS-word screen should look like the one in **Fig. 5-89** below.

**Fig. 5-89:** *Inserted Rectangular shape*



**Fig. 5-90:** *Activating text entry in a shape*



2. Move your mouse point at the middle of your shape and click it once. See **Fig. 5-89** above.
3. Right click on your mouse button. The menu will be displayed as seen in **Fig. 5-90** above.
4. Move your pointer and select **Add Text** as seen in **Fig. 5-90** above.
5. Type the text within your shape as seen in **Fig. 5-91** below.

### 5.2.2. Text Effects and Typography

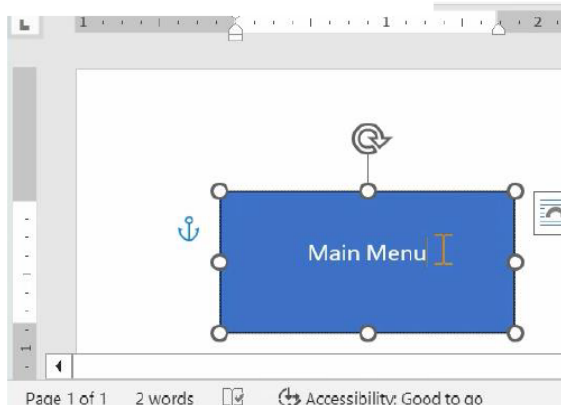
**Text effects** are visual enhancements applied to text to make it stand out. Common text effects in word processing include:

- **Shadow:** - It adds a drop shadow behind the text.
- **Reflection:** - It creates a mirror like reflection below the text.
- **Glow:** - It adds a colored glow around the letters.
- **Bevel:** - It gives a 3D raised or pressed look.
- **Outline:** - It adds a border around the text characters.
- **Transform:** - It changes the shape of the text (e.g. wave, curve, arch)

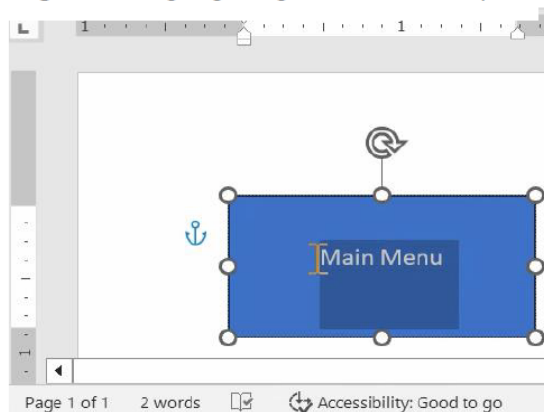
**Typography** refers to the style, arrangement, and appearance of text. The typography of the text include:

- **Font:** - The design of the text (e.g. Times New Roman, Impact, etc)
- **Font size:** - How big or small the text appears.
- **Line spacing:** - The space between lines of text.
- **Kerning:** - Space between individual letters.
- **Alignment:** - How text is placed (left, right, justified)
- **Color and weight:** - Appearing in bold or light and colored letters.

**Fig. 5-91:** Typing text in a shape

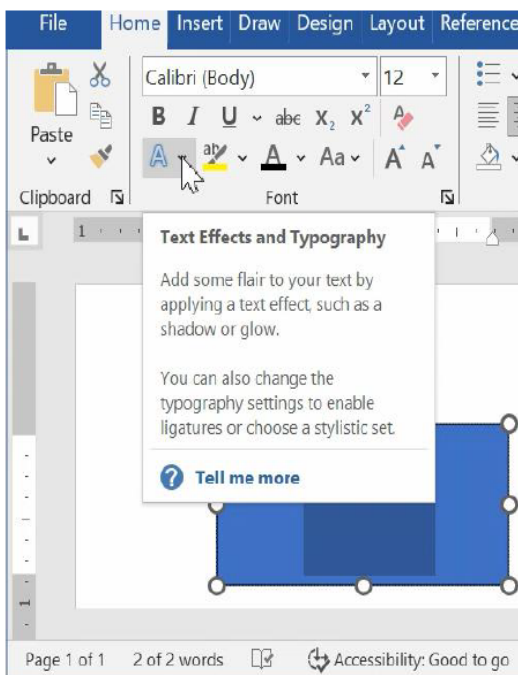


**Fig. 5-92:** Highlighting text within shape

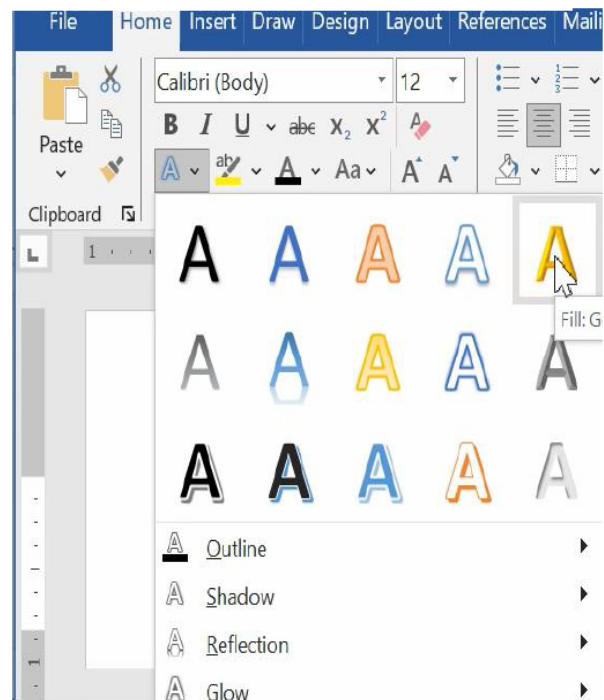


6. Highlight the text within your shape to start manipulating it in a variety of ways. See **Fig. 5-92** above.
7. Move your mouse pointer symbol labeled A, and click to display various *Text Effects*. See **Fig. 5-93** below.
8. Point and select the text effect of your choice as illustrated in **Fig. 5-94** below.
9. While still having your text within a highlighted shape, move your mouse pointer at the font size icon. Click it once to display different font sizes and then select your option. See **Fig. 5-95** below. Your text will be enlarged. See **Fig. 5-96** below.

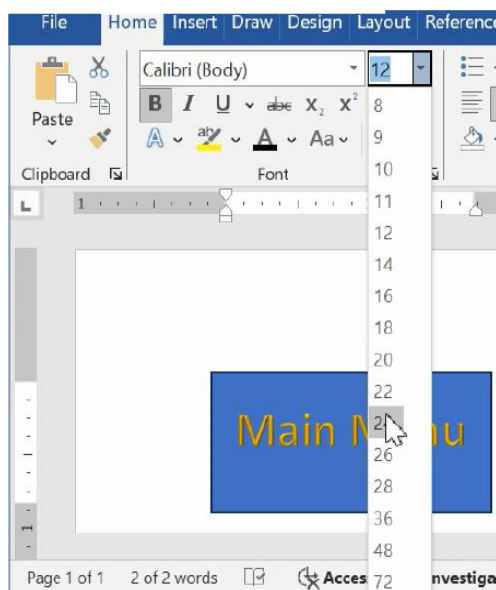
**Fig. 5-93: Adjusting Text Effects**



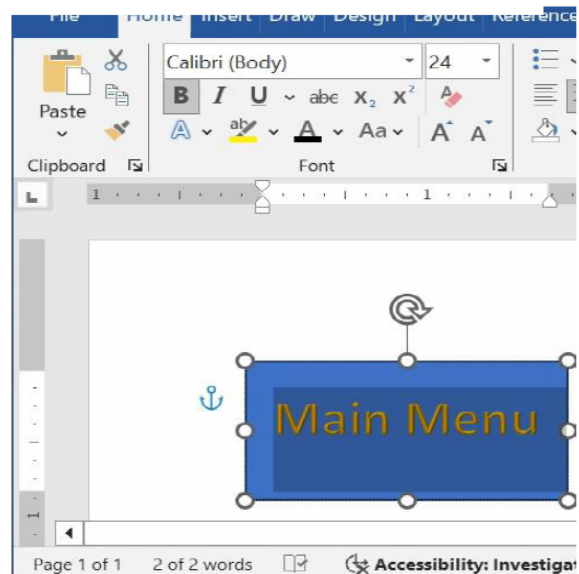
**Fig. 5-94: Displaying various text**



**Fig. 5-95: Changing font size**



**Fig. 5-96: Shows enlarged font design**



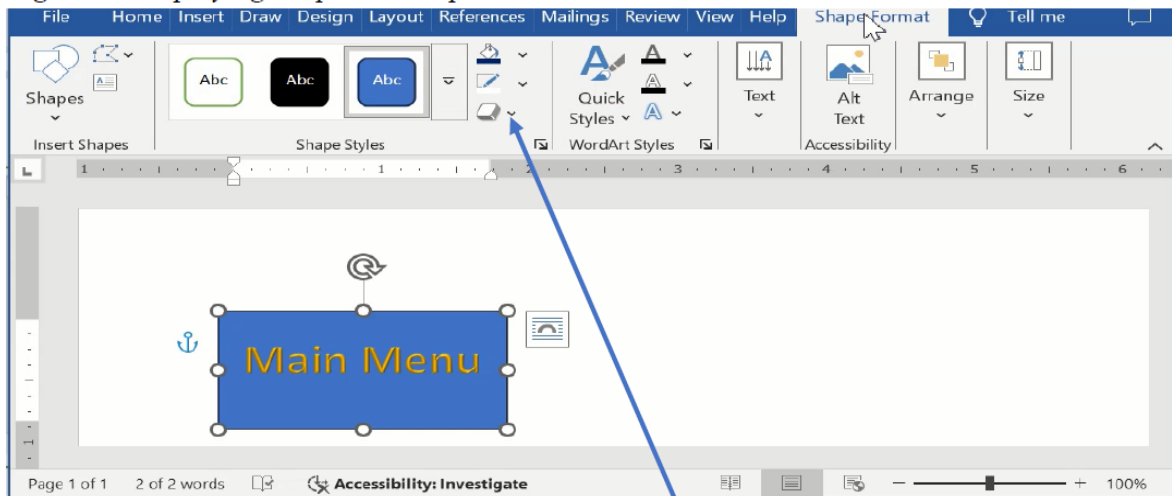
### 5.2.3. 3D-Rotation

Inserted shapes can be rotated to a particular angle creating a variety of side views of inserted shapes. To rotate shapes, we shall follow these steps:

1. You click the side borders of your shape and then click the **Shape Format** tab. See **Fig. 5-97** below. **Shape Format** tab is only displayed when you select the side borders of any inserted shape.

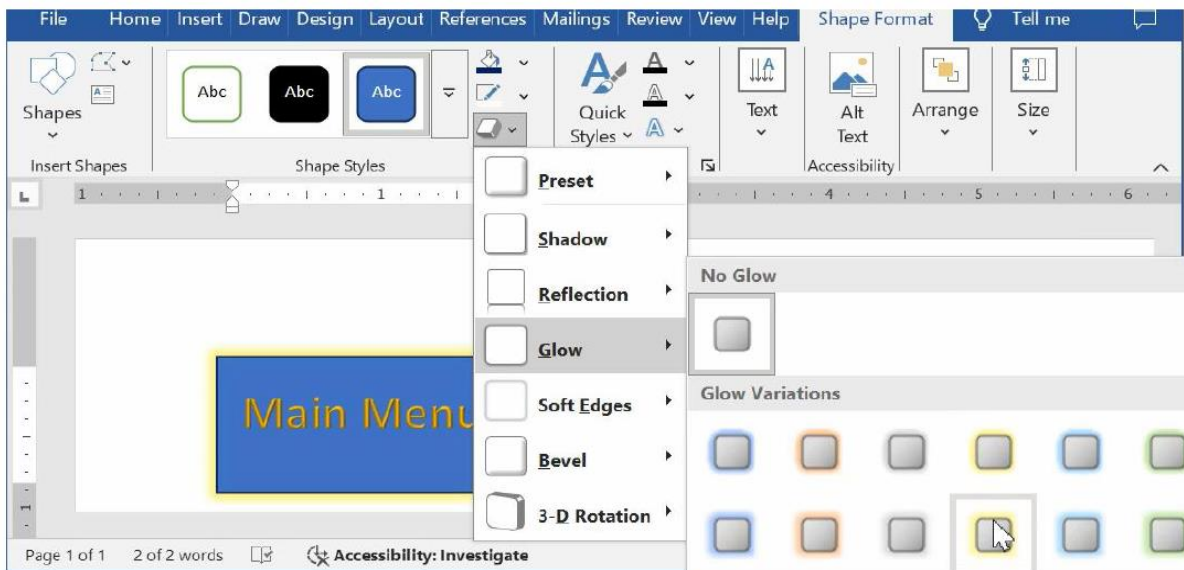
2. Still in **Fig. 5-97**, point and click the *Shape Effect* tiny arrow to display the variety of text effects. See **Fig. 5-98** below.

**Fig. 5-97:** *Displaying Shape Format pane*



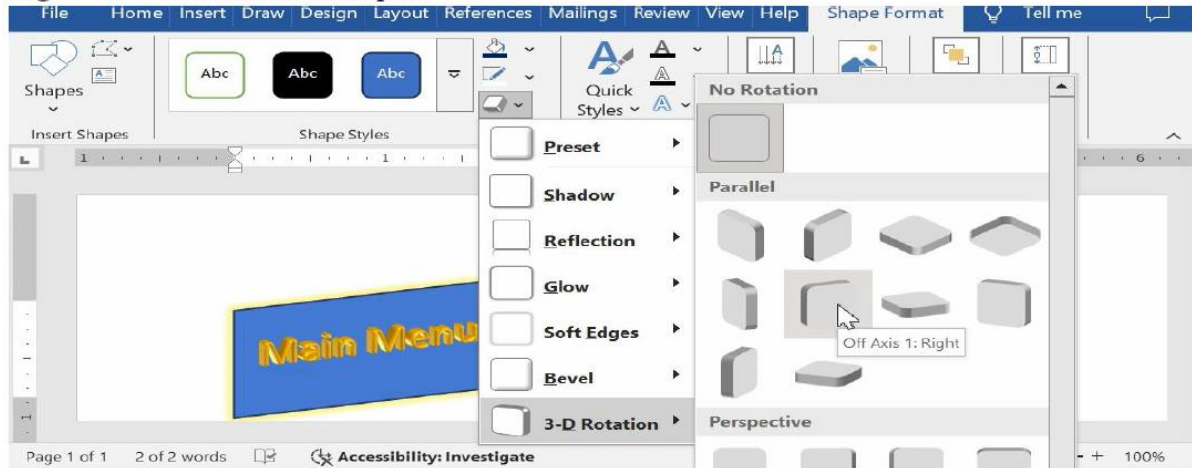
*Click here to display Shape Effects*

**Fig. 5-98:** *Displaying various Shape Effects.*

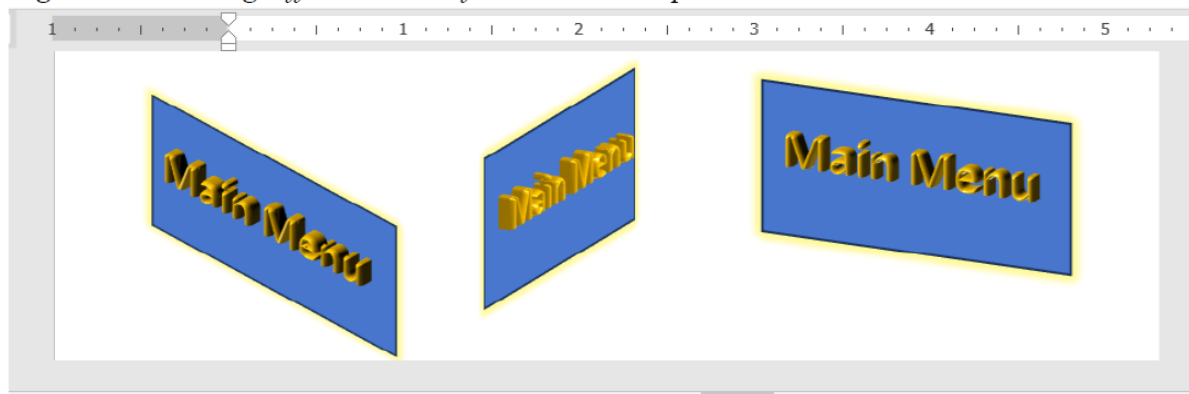


3. From the *Shape Effects* display as seen in **Fig. 5-98** above, point at any shape effect to display multiple shape designs. Select any design.
4. Move the mouse pointer again any click the tiny arrow of the **Shape Effects** to redisplay the variety of shape effects as seen in **Fig. 5-99** below.
5. Move your mouse pointer way down at the *3D-Rotation*. See **Fig. 5-99** below. Select the 3D Rotation option of your choice.
6. Insert other shapes and repeat the exercise. Your work might be similar to the one seen in **Fig. 5-100** below.

**Fig. 5-99:** 3D-Rotation on shapes.



**Fig. 5-100:** Showing different views of 3D-Rotated shapes



### Activity 5-5

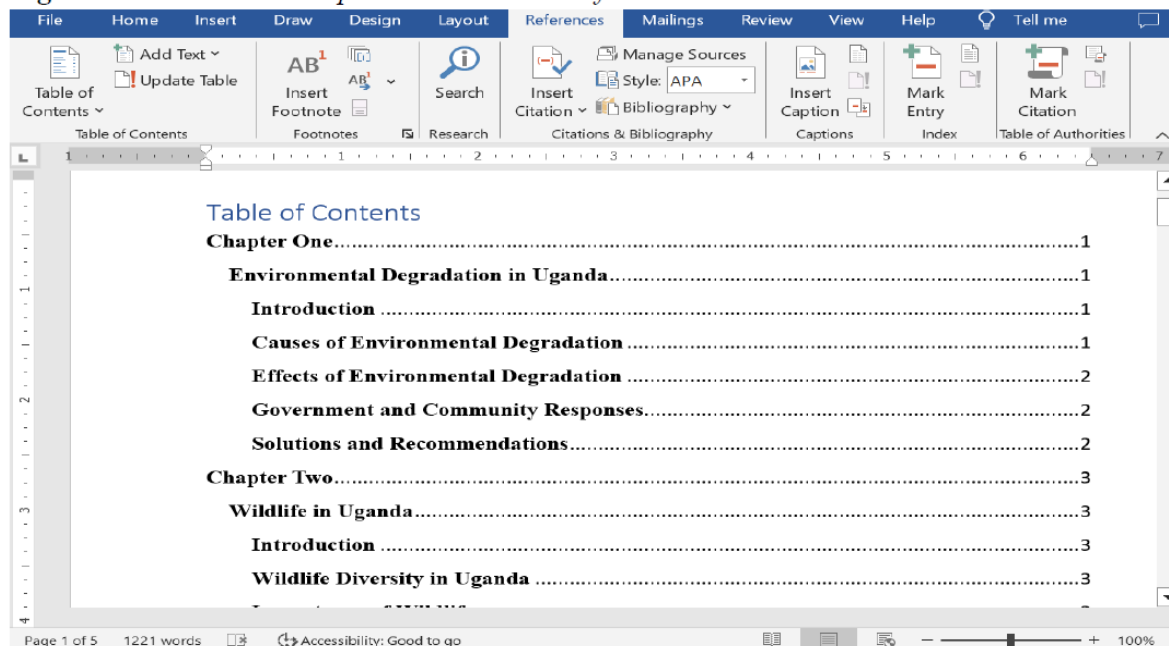
Your school has an administrative chart, perhaps, drawn on a manila card and hang on a wall. Use your computer skill and work as a group and draw the same school administrative organization chart using word processing software.

### 5.2.4. Wrap Text

Wrap text controls how text flows around an object like an image, shape or table. Wrap text can be applied on documents in several ways:

- **In line with Text:** - Object behaves like text character.
- **Square:** - Text wraps around the object's bounding box.
- **Tight:** - Text wraps closely around the object's shape.
- **Through:** - Text flows through any transparent areas of the object.
- **Top and Bottom:** - Text appears only above and below the object.
- **Behind text:** - Object appears behind the text.
- **In front of Text:** - Object covers the text.

**Fig. 5-144:** Shows the Complete inserted Table of Contents



**Note:**

- Deciding which level to give to the subtitle after highlighting it, depends on the structure of your document. For instance, **Chapter One** was given *Level 1* and **Chapter Two** is also given *Level 1*.
- The general heading of the first chapter “*Environmental Degradation in Uganda*” is given *Level 2*, in hope that its ranking is lower than the name of the chapter, and so on.

**5.3.3. Using Mail Merge**

Mail Merge is a feature in Microsoft word that enable users to send personalized documents (like letters, labels, or e-mails) to many recipients at once using a template and a data source like **MS-Excel** or **MS-Access**.

The feature is very useful when you want to send the same message to different addresses collected from a stored file.

For instance, a school might decide to write to parents to inform them about new introduced fund contribution required by all parents because of the rising cost of living. The school will write the same message to all the parents, but it will use the table which has all the necessary addresses that are to be used to send letters to respective parents.

There are three major methods to construct the mail merge:

- Typing the New List.
- Using the Stored List.
- Select from Outlook Contacts

### 5.3.4.1. Typing the New List

In this method you need to type the list in a table containing unique details for each recipient of the letter.

Now, assume your school consulted parents about the new contribution to be made to support the smooth running of the school program because of the rising cost of living. The **Table 5-1** below shows a list of parents who pledged to make their contribution.

**Table 5-1**

<b>Title</b>	<b>Name</b>	<b>Pledge</b>	<b>Final Date</b>	<b>Days</b>
Dr.	Ali Mangunge	1,000,000/=	12/8/2025	18
Prof.	Ann Maneno	500,000/=	1/8/2025	60
Mr.	Juma Karama	1,500,000/=	20/8/2025	40
Ms.	Rose Namara	1,200,000/=	15/9/2025	45
Pr.	Paul Bumba	2,000,000/=	20/9/2025	10

Then, the school would wish to remind parents who pledged to support the school with an extra fund by writing to them as:

Makosa High School  
P. O. Box 888  
Samehe.  
30/9/2025

Dear **Dr. Ali Mangunge**,

**RE: A POLITE REMINDER**

In reference to the above heading, the administration of Makosa High School is kindly reminding you to honor your pledge of **1,000,000/=** that you made.

Your contribution should have been honored by **12/8/2025**, which translate to **18** days ago as of now.

The school administration is wishing you good health as they are looking forward to receive your kind contribution.

Yours in service,

**Kalmata Kiamba.**  
**HEADTEACHER.**

#### Note:

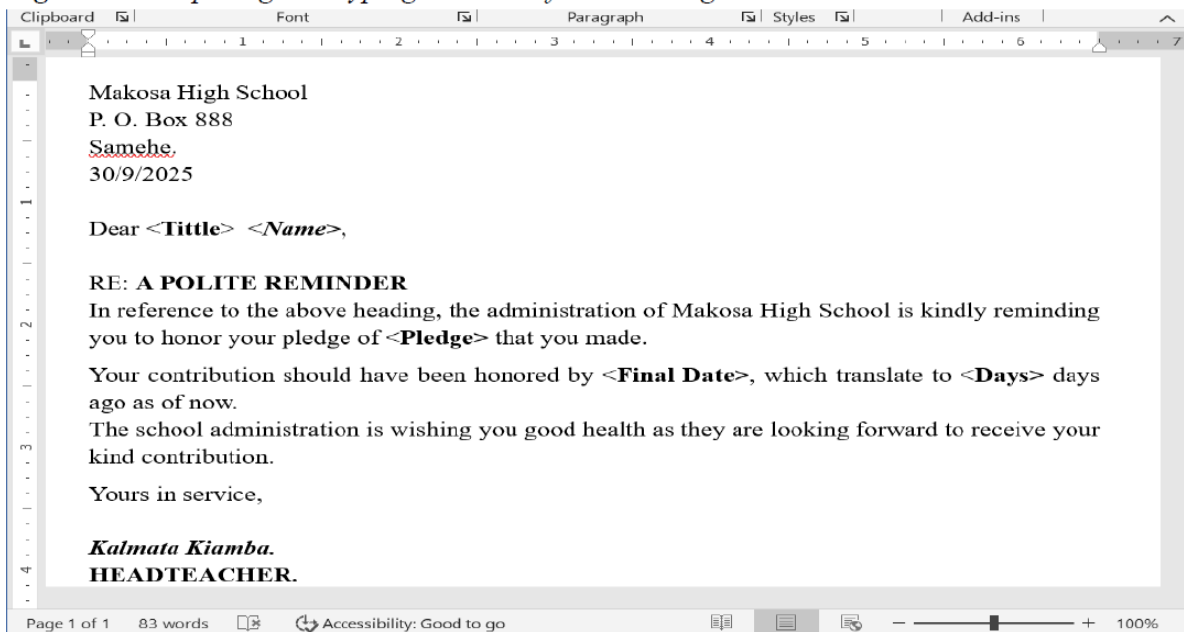
- You can realize that the information in the above letter such as **Dr, Ali Mangunge**, **1,000,000/=**, **12/8/2025** and **18** are extracted from the **Table 5-1** above.

- You can also realize that to write to another parent, say *Prof. Ann Maneno*, the kind of message will be the same with the exception of the *Title*, *Name*, *Pledge*, *Final Date* and *Days*, which will be different for each parent.
- Should the list of parents in the **Table 5-1** above grows to a substantial number, say thousands of parents with pledges, writing to them one by one can take a serious amount of time.
- To solve this, one letter can be written and mail merge features can be utilized to generate letters for each parent, as we are going to see.

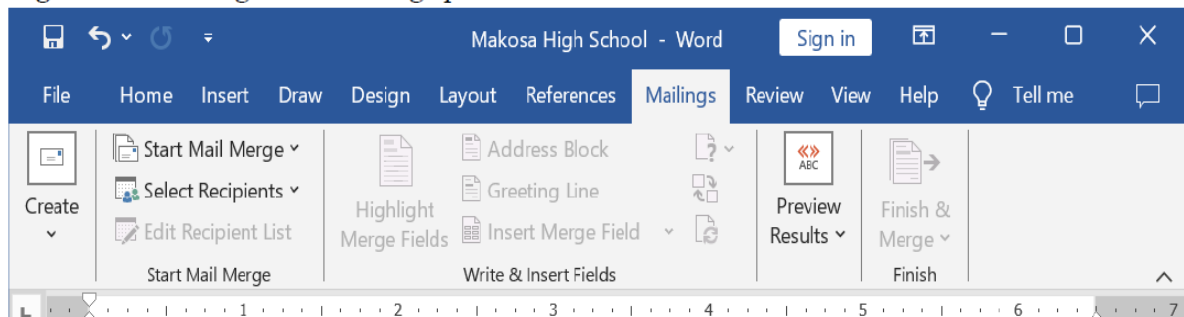
So, to generate several letters using mail merge you can follow the steps below:

1. Type your letter and mark the fields containing unique information to be obtained from a different data source as seen in **Fig. 5-145** below.
2. Point and click **Mailings** tab from the menu bar to display the mail merge features. See **Fig. 5-146** below.

**Fig. 5-145:** *Preparing and Typing the Letter for mail merge*

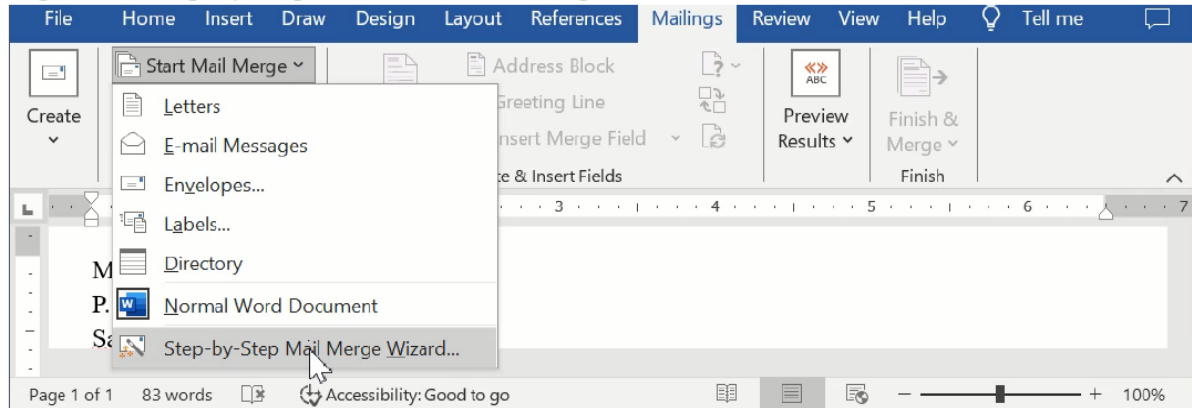


**Fig. 5-146:** *Starting the mail merge pane*

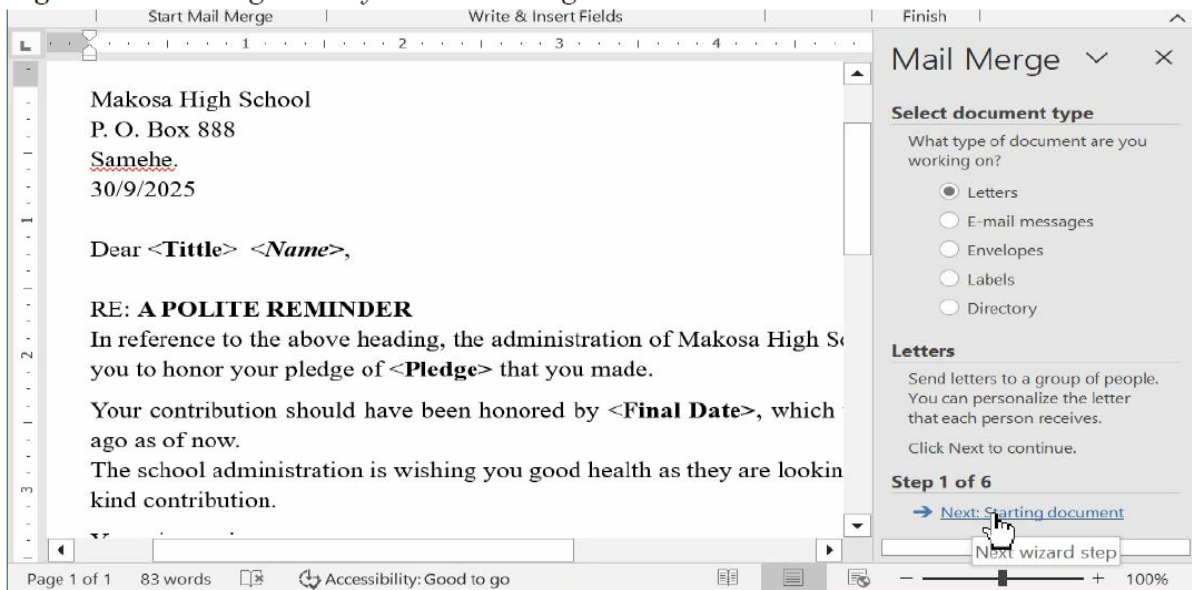


3. Move your mouse pointer and select **Start Mail Merge**. Several options will be displayed on the list as seen in **Fig. 5-147** below.
4. Click **Step-by-Step Mail Merge Wizard...** from the list of options as seen in **Fig. 5-147** below. The **Mail Merge** pane will be displayed on the right-hand side of your letter. See **Fig. 5-148** below.

**Fig. 5-147:** *Step-By-Step wizard with mail merge.*

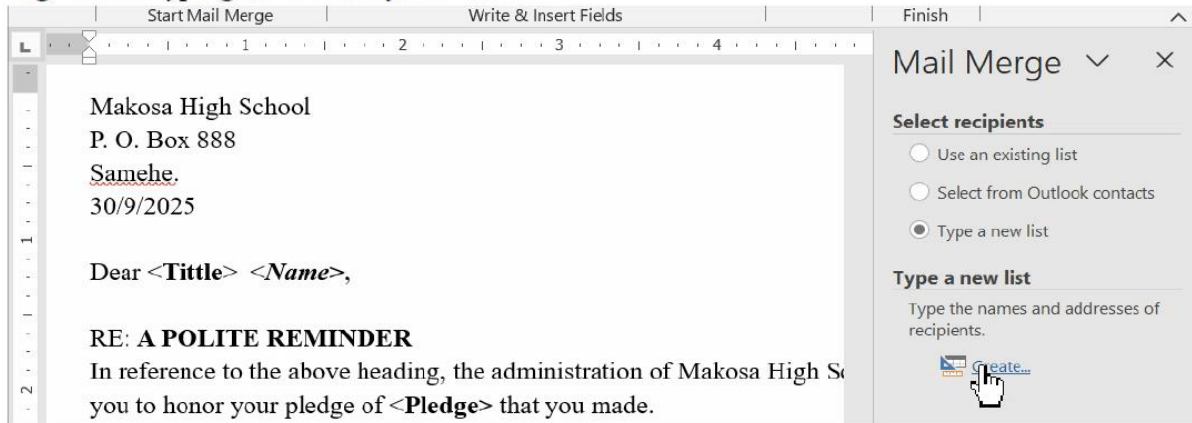


**Fig. 5-148:** *Selecting Letters for the mail merge*

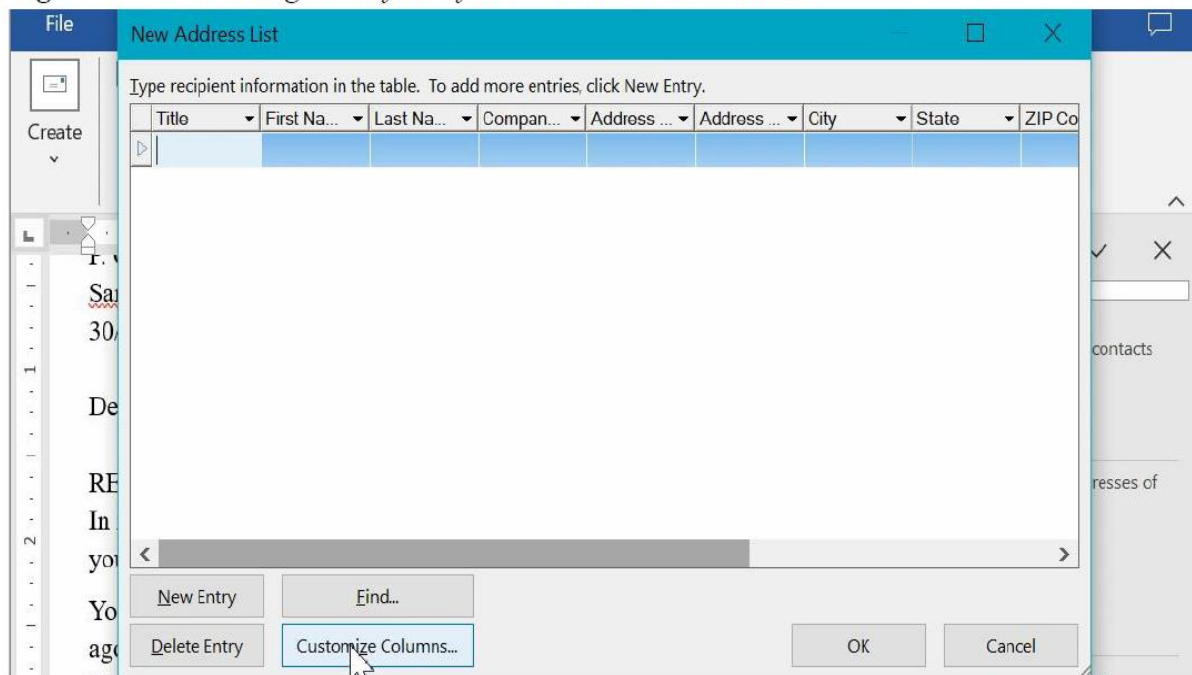


5. On the **Mail Merge** pane in **Fig. 5-148** above, you will be asked to select the document type – i.e. **Letters**, **E-mail Messages**, **Envelopes**, **Labels**, or **Directory**. Ensure that **Letters** is selected and then on **Step 1 of 6** – click **Next: Starting document**. You will be on the **Step 2 of 6** as seen in **Fig. 5-149** below.
6. On **Mail Merge** pane – where they say: **Select Recipients**, move your mouse pointer and click **Type a New List**. The **Type a new list** feature will be displayed with the icon labeled **Create** as seen in **Fig. 5-149** below.
7. Click the **Create** icon. The **New Address List** table will be displayed ready for you to enter data. See **Fig. 5-150** below.

**Fig. 5-149:** *Typing the new list for data source*



**Fig. 5-150:** *Shows the general fields for the new address list table*



8. The displayed **New Address List** fields are general and cannot always suit our required field needs. To customize the fields in the way we want, point and click **Customize Columns...** See **Fig. 5-150** above. The **Customize Address List** will be displayed as seen in **Fig. 5-151** below.
9. Look at the fields in **Table 5-1** above which are *Title, Names, Pledge, Final Date, and Days*. In the **Customized Address List**, you will click each field in their order and rename those which do not match the ones in **Table 5-1** above.
10. In this case, you select **First Name**, then click **Rename** as seen in **Fig. 5-151** below. The **Rename Field** dialog box will be displayed as seen in **Fig. 5-152** below.
11. Delete the field **First Name** and type **Name** as a new field and click **Ok** once.

# THE TOPIC CONTINUES

**You can order for the complete book on:**

0774568543

0709660974

## TOPIC SIX

### Electronic Spreadsheet

#### 6.1. Working with Spreadsheet Software

Have you ever worked in a shop with too many stocked items? Do you use a special book to record all the items stocked in a shop and their prices? Have you ever created a small budget to purchase things at home or for a function? The application like spreadsheet can be of great use to manage small- and large-scale budgeting.

##### 6.1.1. Definition.

- A **spreadsheet** is an interactive computer application program for organization and analysis of data in tabular form. It is an electronic worksheet divided into rows and columns that can be used to analyze and present business data.
- Any spreadsheet program can be used to manipulate (process) financial, statistical, accounts, and even scientific data, provided that users have learnt the necessary functions, or tools suitable for their respective problems.

Examples of electronic spreadsheets include:

- i. **Microsoft Excel** – It is most popular and having powerful features for business use.
- ii. **Google Sheets** – It is a cloud-based spreadsheet that provides real-time collaboration.
- iii. **LibreOffice Cal** – It is free and Open Source alternative to MS-Excel.
- iv. **Zoho Sheet** – Web-based and good for team collaboration.
- v. **Airtable** – It combine spreadsheet and database features.
- vi. **Apple Numbers** – It is a user-friendly software mostly used in macOS and iOS users

#### Activity 6-1

Your aunt has recruited you to work in her busy hardware shop at the City Center. The shop sales variety of hardware tools and materials that are used in construction. Your major work is to keep the records. Your aunt doesn't own a computer or any electronic devices.

#### Task

- (a) In group or individually, write down the methods you will use to keep the records.
- (b) Write down the nature of records that you think that must be kept on daily basis.
- (c) Which kind of calculations do you think might be necessary to be performed and recorded?

#### 6.1.2. Functions of Spreadsheet Software

Spreadsheet programs are used to implement a variety of tasks in businesses, learning institutions, and any other setup companies where keeping records is key. The most common functions of spreadsheet software include:

- Data entry and storage organized in rows and columns layout such as items, numbers, dates, etc.
- Use built-in functions to perform calculations,
- Used for data analysis such as sorting, filtering or summarize data for easy follow-up.

- Creating charts and graphs for visual representations of detailed data.
- Managing budgets, e.g. for grant applications and project expenses
- Formatting by highlighting key data using colors and borders.

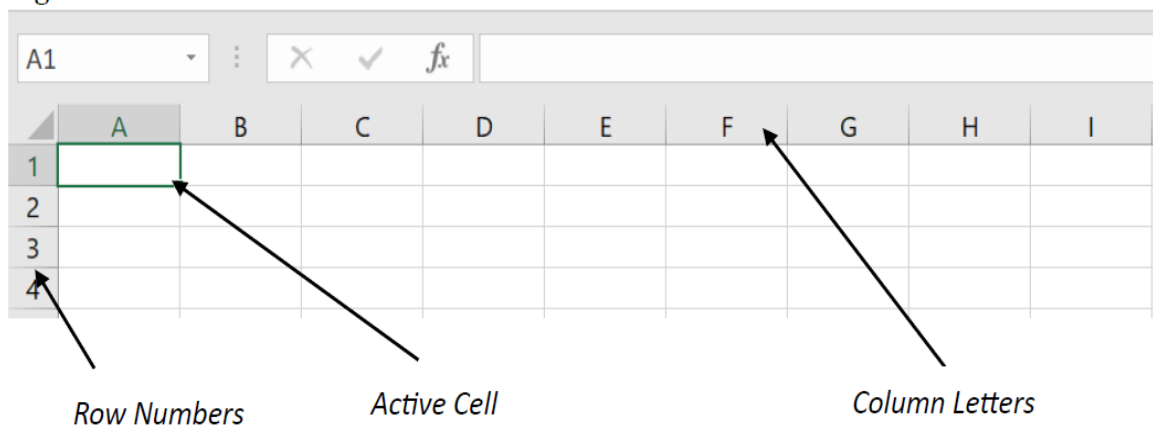
### 6.1.3. Characteristics (Features) of Spreadsheet Programs

- **Automatic Recalculation:** - Once formulas or functions are entered in the worksheet the recalculation will take place whenever values of table are changed.
- **Searching and Filtering:** - It is a tool used to look for a specific type of data e.g. searching for January sales only.
- **Conditional Formatting:** - This feature enables one to locate and format only particular set of data in the worksheet based on the set criteria.
- **Pivot Tables:** - It is a very powerful tool used to summarize huge amount of data into a small table.
- **Graphing:** - It is a tool used to represent numerical data into graphical form enabling the user to quickly observe the trend of particular situation.
- **Sorting:** - It is a tool used to sort textual data alphabetically or numerical data ascending or in descending order.
- **Database Lookup:** - It can be used to connect to external databases and get values.
- **Macro Language Support:** - Allows complicated subroutines and functions to be written i.e. programming.
- **Import/Export Support:** - Can be used to load input values from other applications or to save output values.

### 6.1.4. Cells and Active Cell

A **cell** is an intersection of a **row** and a **column**. A typical spreadsheet must have **row numbers** (usually appearing at the left side of the worksheet) and **column letters** (usually appearing at the top side of the worksheet).

**Fig. 6-1:** Shows cells in a worksheet



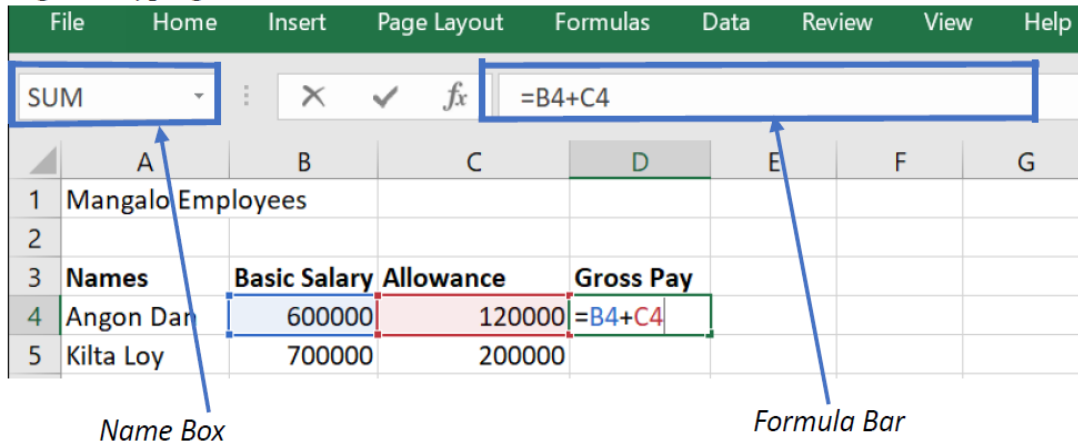


### 6.2.1. Relative Reference

Relative reference describes a cell reference that changes automatically when you copy a formula. When we enter a formula in MS Excel cell once, we tend to copy the same formula to other applicable cells to save the considerable time of typing.

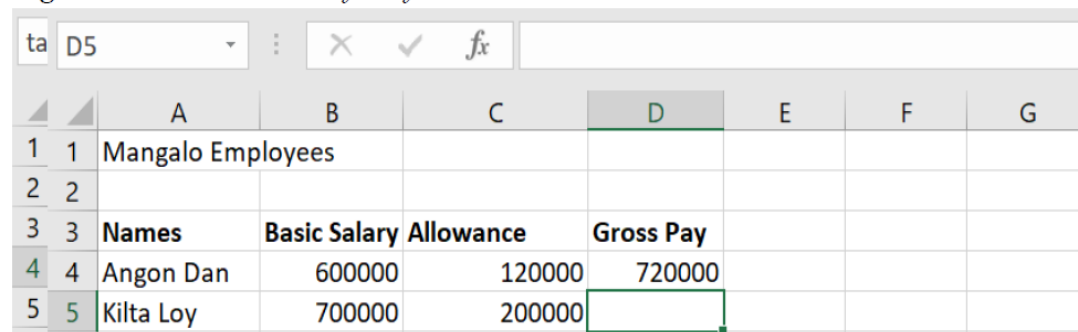
For instance, if you have a formula:  $=B2 + C2$  typed to add values in **row 2**, then if there are values in **row 3** positioned in the same columns, we can just copy the same formula. When the formula is copied, it will change to  $=B3 + C3$ . See **Fig. 6-8** and **Fig. 6-9** below.

**Fig. 6-8:** Typing the Formula.



When you press Enter key after typing your formula as in **Fig. 6-8** above, the result of the formula will be displayed. See **Fig. 6-9** below.

**Fig. 6-9:** Shows the result of the formula  $=B4+C4$



However, in situations where you have very many rows to calculate Gross Pay, you can consume a lot of time to continue typing other formulas beneath it as  $=B5 + C5$ ,  $=B6 + C6$  and so on.

Alternatively, we can copy the same formula to other cells where the same formula will relatively change to suit the reference of other values found in other rows.

**Fig. 6-10** below, shows the mouse pointer at the right bottom corner of cell **D4** in dark crossed shape. The left mouse button is then held down before dragging downwards to cell **D8**. See **Fig. 6-11** and **Fig. 6-12** below.

**Fig. 6-10:** Obtaining the fill handle (black cross) and start dragging

	A	B	C	D	E	F	G	H	I
1	Mangalo Employees								
2									
3	<b>Names</b>	<b>Basic Salary</b>	<b>Allowance</b>	<b>Gross Pay</b>					
4	Angon Dan	600000	120000	720000					
5	Kilta Loy	700000	200000						

**Fig. 6-11:** Performing relative copying

	A	B	C	D
1	Mangalo Employees			
2				
3	<b>Names</b>	<b>Basic Salary</b>	<b>Allowance</b>	<b>Gross Pay</b>
4	Angon Dan	600000	120000	720000
5	Kilta Loy	700000	200000	
6	Macnon Tom	540000	100000	
7	Tekla Soy	480000	90000	
8	Alma Dakla	750000	220000	

**Fig. 6-12:** Shows the complete added values

	A	B	C	D
1	Mangalo Employees			
2				
3	<b>Names</b>	<b>Basic Salary</b>	<b>Allowance</b>	<b>Gross Pay</b>
4	Angon Dan	600000	120000	720000
5	Kilta Loy	700000	200000	900000
6	Macnon Tom	540000	100000	640000
7	Tekla Soy	480000	90000	570000
8	Alma Dakla	750000	220000	970000

### The Formula Bar

The formula bar is located above the worksheet cells and its functions are:

- To display contents of the active cell such as text, numbers, or formula inside the selected cell. See Fig. 6-8 above.
- It allows direct editing of the selected cell content.
- It allows viewing of very long formula that cannot be viewed in a narrowed column.

### The Name Box

- The **Name Box** is used to display the cell address of an active cell i.e. the selected cell anywhere in the worksheet. See Fig. 6-12 above.
- The **Name Box** can also be used for quick navigation where if you type any cell address in the name box and then press the **Enter** key, the **Excel** takes you in that referenced cell immediately. You can try out!
- **Name Box** can also be used to name the range of cells where by you select the range of cells then you click at the name box and type the name of that range.

### Activity 6-2

Sales are recorded in a hardware shop using a sales record book. The recorded details include items sold, quantity sold and the price of each item in a period of one month. You have been hired to enter that work in a spreadsheet worksheet layout and calculate the total price for each item.

#### Task

- You can visit a hardware shop near you and request to observe their sales record done in an ordinary book and use your computer skills to create an electronic spreadsheet.
- Use a formula to perform the necessary calculation as described above.

To work on the above **Activity 6-2**, you can follow the steps below:

- You can open the file within your **SabaSaba** folder called **Example 6-2** or type the data you collected from the nearby hardware. See **Fig. 6-13** below.
- Use your mouse pointer and select cell **D3** and type the heading **Total Price**. See **Fig. 6-14** below.

**Fig. 6-13:** The List of Hardware items with prices

	A	B	C	D
1	Kamadara Hardware			
2				
3	<b>Item Sold</b>	<b>Quantity Sold</b>	<b>Item Price</b>	
4	Cement	40	30000	
5	Hammer	2	15000	

**Fig. 6-14:** Adding the heading **Total Price**

	A	B	C	D
1	Kamadara Hardware			
2				
3	<b>Item Sold</b>	<b>Quantity Sold</b>	<b>Item Price</b>	<b>Total Price</b>
4	Cement	40	30000	
5	Hammer	2	15000	

#### Note:

To calculate **Total Price** for each item sold, you have to use a simple formula as:

$$\text{Total Price} = \text{Quantity Sold} \times \text{Item Price}$$

So, for cement,

$$\text{Total Price} = 40 \times 30000 = 1200000.$$

However, using Microsoft Excel you need to use cell addresses that point at the values you are aiming at calculation.

- You can now locate cell **D4** and type the formula **=B4\*C4** as seen in **Fig. 6-15** below, which will be used to calculate the **Total Price**. The asterisk symbol (\*) represent the multiplication operation.
- Press the **Enter** key when done. Your work should be like the one in **Fig. 6-16** below.
- You may need to recalculate the **Total Price** of other items in other cells. However, to retype the formulas is not only hectic but you can easily make mistakes.
- To solve this, you can click the cell **D4** which has the answer and point at the right bottom corner of that cell until the pointer turns into a black cross as seen in **Fig. 6-17** below.

- Hold down the left mouse button while the black cross (fill handle) is still positioned at the lower right corner of cell **D4** and drag down to the last item (cell **D15** in case you opened the **Activity 6-2** as your support file). See **Fig. 6-18** below.

**Fig. 6-15:** Typing a formula in a cell.

	A	B	C	D
1	Kamadara Hardware			
2				
3	<b>Item Sold</b>	<b>Quantity</b>	<b>Item Price</b>	<b>Total Price</b>
4	Cement	40	30000	=B4*C4
5	Hammer	2	15000	

**Fig. 6-16:** Shows the result of the formula.

	A	B	C	D
1	Kamadara Hardware			
2				
3	<b>Item Sold</b>	<b>Quantity</b>	<b>Item Price</b>	<b>Total Price</b>
4	Cement	40	30000	1200000
5	Hammer	2	15000	

**Fig. 6-17:** Copying the formula to other cells

	A	B	C	D
1	Kamadara Hardware			
2				
3	<b>Item Sold</b>	<b>Quantity</b>	<b>Item Price</b>	<b>Total Price</b>
4	Cement	40	30000	1200000
5	Hammer	2	15000	
6	Iron Sheet	70	90000	
7	Pipes	8	18000	
8	Bulbs	30	12000	
9	Varnish	40	25000	

**Fig. 6-18:** Shows the complete calculated column

	A	B	C	D
1	Kamadara Hardware			
2				
3	<b>Item Sold</b>	<b>Quantity</b>	<b>Item Price</b>	<b>Total Price</b>
4	Cement	40	30000	1200000
5	Hammer	2	15000	30000
6	Iron Sheet	70	90000	6300000
7	Pipes	8	18000	144000
8	Bulbs	30	12000	360000
9	Varnish	40	25000	1000000

### Activity 6-3

A bakery Company in Jinja is planning to increase salary of all workers by **15%**. The list of workers is provided to you in an Excel spreadsheet worksheet showing the employees' names with their corresponding old salary.

#### Task

- Use your ICT skill to determine the scale of new salary by all employees.
- From the new salary, the workers will also pay tax of **3%**. Calculate the tax and the net pay for each employee.

The above activity can be done by understanding the scenario and the task to be done. You can open the file named **Activity 6-3.xlsx** and then follow the steps below:

- Open the file named **Activity 6-3.xlsx** from **The SabaSaba** folder. You can copy and rename the file using a different name of your choice. See **Fig. 6-19** below.
- Add the **New Salary** header and enter the formula to calculate the new salary. The formula to calculate the new salary can be written as: **=15%\*B4+B4** or **=115\*B4**. See **Fig. 6-20** and **Fig. 6-21** below. Press **Enter** key when done.
- Point and select cell **C4** and then drag the fill handle (dark cross) to copy the same formula to other cells.

- Click the cell **D4** to and enter the formula to calculate the tax i.e. **=3%\*B4**. See **Fig. 6-22** below.

**Fig. 6-19:** The opened file named *Activity 6-3*

	A	B	C	D	E	F	G	H	I
1	JINJA BAKERY COMPANY								
2									
3	<b>Employee Name</b>	<b>Basic Salary</b>							
4	Mark Dura	800000							
5	Binawa Leila	900000							

**Fig. 6-20:** Typing the formula to calculate the new salary

SUM									
Name Box									
	A	B	C	D	E	F	G	H	I
1	JINJA BAKERY COMPANY								
2									
3	<b>Employee Name</b>	<b>Basic Salary</b>	<b>New Salary</b>						
4	Mark Dura	800000	=15%*B4+B4						
5	Binawa Leila	900000							

**Note:**

- To enter formula to calculate the salary increase you need to understand the basic arithmetic needed to solve the problem. On a sheet of paper, one could write as:

$$\text{Amount increased} = \frac{15}{100} \times \text{Old Salary}$$

$$\text{So, New Salary} = \text{Amount Increased} + \text{Old Salary}$$

$$\text{This is the same as } =15\% * \text{B4} + \text{B4}$$

**Fig. 6-21:** Shows the alternative formula that can work the same as in **Fig. 6-20**

	A	B	C	D	E	F	G	H	I
1	JINJA BAKERY COMPANY								
2									
3	<b>Employee Name</b>	<b>Basic Salary</b>	<b>New Salary</b>						
4	Mark Dura	800000	=115%*B4						
5	Binawa Leila	900000							

- You can move your pointer and click cell **E3** to type the new heading **Net Pay**. Press the **Enter** key and type the formula to calculate the Net Pay. To calculate net pay you need to take away tax from the new salary i.e. **=C4-D4**. See **Fig. 6-23** below.

**Fig. 6-22:** *Typing the formula to calculate tax*

	A	B	C	D	E	F	G	H	I
1	JINJA BAKERY COMPANY								
2									
3	<b>Employee Name</b>	<b>Basic Salary</b>	<b>New Salary</b>	<b>Tax</b>					
4	Mark Dura	800000	920000	=3%*C4					
5	Binawa Leila	900000	1035000						

**Fig. 6-23:** *Typing the formula to calculate Net Pay*

	A	B	C	D	E	F	G	H	I
1	JINJA BAKERY COMPANY								
2									
3	<b>Employee Name</b>	<b>Basic Salary</b>	<b>New Salary</b>	<b>Tax</b>	<b>Net Pay</b>				
4	Mark Dura	800000	920000	27600	=C4-D4				
5	Binawa Leila	900000	1035000	31050					

### 6.2.2. Absolute Reference

- Absolute reference refers to a cell reference that **does not change** when a formula is copied or moved to another cell.
- Absolute reference is used to lock specific cell when copying formulas such as tax rate, constant value or reference cell.
- To make a cell address an absolute reference you place the dollar sign (\$) before the column letter and also before the row number. For instance, **B2** could be written as **\$B\$2**.
- We only make the cell address absolute reference if it contains a constant value or a value that is going to be reused during calculation.

#### Activity 6-4

In this activity, we shall redo **Activity 6-3** above, but this time we are going to use the absolute reference to all values that are being reused in calculations.

Notice that the values that are reused in the previous activity are salary increase rate of **15%** and the tax rate of **3%** imposed to each employee.

To proceed with absolute reference, we shall follow the steps below:

1. Open the file named **Activity 6-4.xlsx** located in the support file named **The SabaSaba** and add the labels as **New Salary**, **Tax**, **Net Pay**, **%Increase**, and **Tax Rate**. See **Fig. 6-24** below.
2. Add the reusable values **15%** for %Increase and **3%** for Tax Rate as seen in **Fig. 6-24** below.
3. Type the formula for calculating Salary Increase i.e. **=C\$2\*B4+B4**. See **Fig. 6-25** below.
4. Type the formula for calculating Tax i.e. **=D\$4\*B4**. See **Fig. 6-26** below.
5. Type another formula to calculate **Net Pay** in similar way you did in **Fig. 6-23** above.

- **=MAX()** used to find and display the highest value in a list of numbers within a given range of cells.
- **=MIN()** used to find and display the lowest value in a list of numbers within a given range of cells.
- **=PRODUCT()** used to find a product of a list of numbers within a given range of cells.
- **=MODE()** used to find a number with the highest occurrence in a list of numbers with a given range of cells.
- **=COUNT()**
- **=ROUND()** used to round a value to a specific number of digits.
- **=RANK()** used to return a position of a number from a given range of cells.
- **=MEDIAN()** used to find the middle value in a list of numbers within a given range of cells.
- **=IF()** used to perform logical tests and return different values based on whether the test is TRUE or FALSE.

### Activity 6-9

A group of form two students sat mid-term examination in various subjects and after marking, the results were punched into a MS-excel worksheet. However, the class teacher who is not a computer literate has approached you to help him to use MS-Excel functions to quickly obtain the total and average scores in all subjects for every student. The class teacher also wants to know the highest, lowest, and the mode values scored from each subject. Finally, the class teacher also needs to know the position of each student based on their total performance.

### Task

By the use of your computing skills, help out the class teacher of this class to have his job done.

To solve the task above to help the class teacher the following guideline can be followed:

1. Open the file named **Activity 6-9.xlsx** located in **The SabaSaba** folder. See **Fig. 6-61** below.
2. From the opened file, you can adjust the column widths, add some necessary headers and insert borders to make your work neat. See **Fig. 6-62** below.

**Fig. 6-61:** Shows the *Activity 6-9.xlsx* file open.

	A	B	C	D	E	F	G	H	I
1									
2	NAMES	ENG	MATH	CHE	CRE	GEO	BIO	PHY	ICT
3	Dan Makoko	56	87	67	57	56	69	58	65
4	Lorna Apio	77	65	45	49	87	40	59	73
5	Zoe Wanyana	56	63	67	78	65	60	49	65

3. Locate the cell **L3**, and type the function **=SUM(B3:K3)** to add the Total marks of the first student. Notice the use of full colon (:) to specify the range of cells to be added i.e. from cell **B3** up to **K3**. See **Fig. 6-63** below.

## 6.5. Creating PivotTables

A Pivot table is a powerful tool to calculate, summarize, and analyze data that lets you see the comparisons, patterns, and trends in your data.

Pivot tables can be used to summarize data e.g. total sales by region, group data by category, to count, sum, average or filter information, and compare values easily.

### Activity 6-15

Mr. Bangita John is a school bursar managing school fees payment by all students. He enters all the details in a spreadsheet worksheet that include student names, the class of the student and the amount paid. At the end of the term, he is supposed to give a summary report to the Board of Directors the subtotal payments by each class and the overall total (grand total) payment.

Mr. Bangita has no knowledge of how to use spreadsheet tools to generate his summary as quickly as possible. He attached his worksheet named **Activity 6-15.xlsx** on the e-mail he sent to you for help.

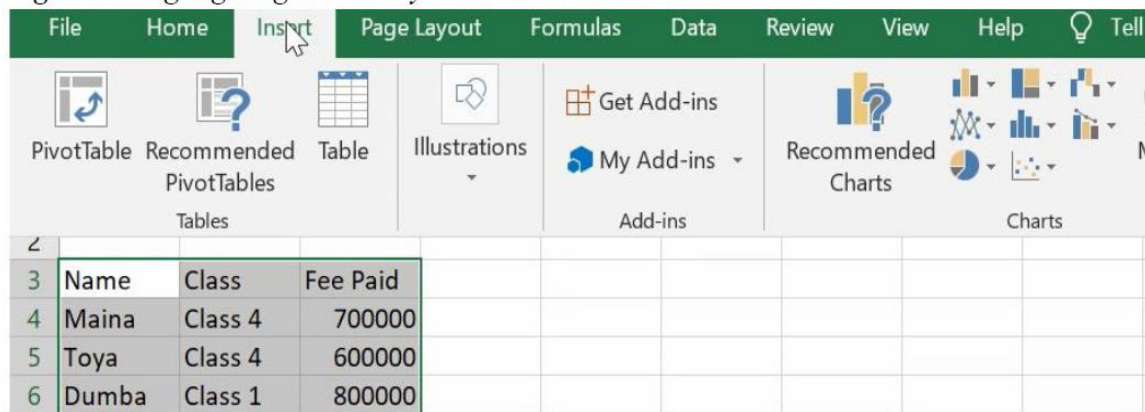
### Task

Use your skills and generate the summary of school fees payments on class basis.

From the above activity, we can implement it by following the steps below:

1. Open the file named **Activity 6-15.xlsx** located in **The SabaSaba** folder. See **Fig. 6-99** below.
2. Highlight the entire content in the worksheet and the point and click the **Insert** tab and then click **Recommended PivotTables** icon. See **Fig. 6-99** below.

**Fig. 6-99:** Highlighting data ready to create the Pivot Table



3. On the **Recommended PivotTables** dialog box seen in **Fig. 6-100** below move your mouse pointer and select **Sum of fee paid by class** and then at the bottom right click **Ok**.
4. You will realize that the **PivotTable** will be created in another worksheet but within the same workbook. See **Fig. 6-101** below.
5. In **Fig. 6-102** below, at the right side shows three fields: **Name**, **Class** and **Fee Paid**. Notice that the **Name** field is unchecked.

### Activity 6-17

Monthly Total sales are presented by different salesmen in one of the business companies in Kampala from January to June. All the salesmen with their corresponding monthly sales are recorded in a spreadsheet worksheet. The salesmen's monthly performance is compared by inserting charts for better insight. The file named **Activity 6-17.xlsx** was sent to you via e-mail to process the data that can provide **10%** commission from the obtained total sales by each salesman including creating charts.

#### Task

- (a) Open the file named **Activity 6-17.xlsx** located in your **The SabaSaba** folder and process the data accordingly.
- (b) Make necessary formatting in your presented data.

#### 6.7.1. Column Chart

A column chart is a type of chart in MS-Excel that uses vertical bars (columns) to represent and compare values across different categories.

Key features of column chart include:

- Categories are shown along horizontal (x) axis.
- Values are shown on the vertical (y) axis.
- Each column's height represents the value for that category.

In **Activity 6-17** above, we can be guided on how to create a column chart by following steps below:

1. Open the file named **Activity 6-17.xlsx** located in **The SabaSaba** folder within your PC.
2. Add the labels **Total** and **Commission** in cell **H3** and **I3** respectively. See **Fig. 6-126** below.
3. Use a formula (function) to calculate the Total sales by each salesman.
4. You can add the label **Commission Rate** in cell **A15** and type the **10%** in cell **A16**. You will then type the formula in cell **I4**, which can be used to calculate the commission for each salesman based on the Total sales. See **Fig. 6-127** below.
5. To create the column chart, highlight the data that you are targeting to use for inserting a chart. **Fig. 6-128** below shows the highlighted range of **A3:B12**. Do the same!
6. After highlighting, move your mouse pointer and click the **Insert** tab to display chart features. See **Fig. 6-129** below.
7. Move your pointer and click the chart icon to display several chart types, but at this point you can opt for Column Chart. See **Fig. 6-129** below.
8. After pointing at the chart type, click it once to be inserted on your worksheet. See **Fig. 6-130** below.
9. You can modify the chart title from **January** to **Compares Sales made in January** for better insight.

# THE TOPIC CONTINUES

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## TOPIC SEVEN

### The Internet and Digital Communications

In our modern day-to-day life Internet has become part of our life acting as a main tool to reach out to people. Internet provides an infrastructure for digital devices such as smartphones and computers to exchange digital messages in form of text, voice, images, or videos.

The **Internet** is a worldwide connection of **networks** that links millions of businesses, government offices, educational institutions, and individuals. Internet (International Network) can be described as the global connection of digital devices such as smartphones, and computers.

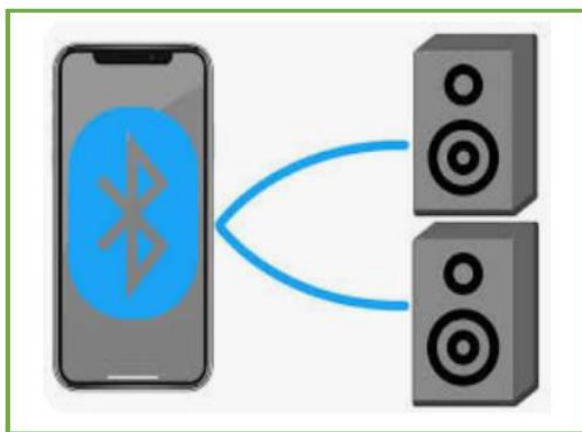
The Digital Communications refers to the electronic exchange of information, data or messages using electronic devices and technology.

#### 7.1.The Electronic Data Sharing

- It is the transferring or exchanging of data between devices, systems, or people through electronic means.
- The electronic data sharing can take place through the use of e-mail, cloud storage (e.g. Google Drive, Dropbox, etc.), Databases, Online Platforms, or APIs between systems.
- Electronic data sharing is very common in business, health care, and government for faster communication, collaboration and access to information.

##### 7.1.1. Bluetooth Technology

- Bluetooth is a wireless technology that uses a radio frequency to share data over a short distance, eliminating the need for wires.
- You can use Bluetooth on your mobile device to share documents or to connect with other Bluetooth-enabled devices.
- For security reasons, Bluetooth devices must be paired before they can begin transferring information. The process of pairing your devices will vary depending on the device you are connecting to.



# THE TOPIC CONTINUES

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## TOPIC EIGHT

### Electronic Publications

Microsoft Publisher is one of the Desktop publishing software which can be applied to design variety of publications. Users can use publisher to design certificates, business cards, invitation cards, flyers, calendars, brochures, newsletters, postcards, catalogs, advertisements, menus, etc.

Publisher provides several templates that users can apply to make their publications without much strain. Users are capable of adjusting the templates until they have something desired in their plan.

#### 8.1. Business Card

People with their personal businesses and in companies will always create business cards to be given to their clients. Business cards will include addresses, telephone contacts, logo of the company, location, name of the company, and the name of an individual working in or owning the company.

**Example 8-1:** Create a business card of a Computer Servicing and Repair company.

Include the following:

- Name of the company called Digital World.
- The Postal address (choose your own) and location.
- Telephone contacts (choose your own)
- E-mail address
- Logo of the company.
- A list of four services offered by the company
- Make the size of your card to be 3.3” by 1.9”
- Make left and right margins to be 0.3”
- Make top and bottom margins to be 1”
- Apply appropriate backgrounds and borders.
- Print multiple cards on A4 paper size.
- Save your file using your name and personal index number.

#### Steps

1. Open the Microsoft Publisher program as seen in **Fig. 8-1** below.
2. Point and click **Business Card** as seen in **Fig. 8-1** below. Several Business card templates will be displayed.
3. Point and double click the business card template labeled **Bounce**. The full template will be displayed as seen in **Fig. 8-2** below.

#### Note:

It is upon the user to put in his/her creativity ability to come up with the best business card possible. The provided template can be modified by adding or reducing suggested graphics,

# THE TOPIC CONTINUES

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## TOPIC NINE

### Electronic Databases

An electronic database is a digital system used to store, organize, and manage data using computers.

Unlike paper records, electronic databases allow for quick searching, easy updating, and secure storage of large amount of information.

Electronic databases are widely used in schools, hospitals, businesses, and government institutions to handle data efficiently. Examples include student records systems, hospital patients' databases, and inventory management systems.

These databases are managed by using software known as Database Management Systems (DBMS).

#### 9.1. Database Concepts

A database is an organized collection of related data that can be easily accessed, managed, and updated.

Instead of storing data in random files, a database stores it in structured formats, like tables, making it easier to retrieve and manage information efficiently.

##### 9.1.1. Database Management Systems (DBMS)

- The DBMS is a software that allows users to store, manage, retrieve, and manipulate data in a structured way. It acts as a bridge, between the user and the database, ensuring data is organized, consistent, secure and easily accessible.
- Examples of DBMS programs include:
  1. Microsoft Access
  2. Oracle
  3. Microsoft SQL Server
  4. PostgreSQL
  5. MongoDB (NoSQL)

##### 9.1.2. Functions of Database Management Systems

DBMS is known to be used in various aspects either online or offline. The very common functions of Data Management Systems include:

- **Data Storage Management:** - It efficiently stores large amounts of data for quick access and management.
- **Data Manipulation:** - Enables users to insert, update, delete, and search data.
- **Data Retrieval:** - Allows users to retrieve specific data using queries such as SQL.
- **Data Security:** - Controls access to data by setting user permission and roles.
- **Backup and Recovery:** - Automatically backs up data and helps recover it after failure.
- **Data Integrity Management:** - Ensures accuracy, and consistency of the data through rules and constraints.
- **Concurrency Control:** - Manages simultaneous data access by multiple users without conflict.

### 9.1.3. Database Models

- Database models are a way to structure and organize data within database. Each model defines how data is connected, stored, and retrieved.
- Common types of Database Models include:
  1. **Hierarchical Model:** - In this model data is organized in a tree-like structure (parent-child relationships) e.g. organization chart.
  2. **Network Model:** - Similar to hierarchical model but it can allow many-to-many relationships in a way that records can have multiple parents and children.
  3. **Relational Model:** - Data is stored in tables (rows and columns) and the tables are linked by field of primary key in one table and the foreign key in another table. This is the most common type of database structure.
  4. **Object Oriented Model:** - Data is stored in objects, similar to object-oriented programming. Good for complex data like images and videos.

### 9.1.4. Relational Model

The relational model is the most widely used database model today. It organizes data into tables (also called relations), which consists of rows and columns.

The key features of relational database model include:

- **Tables (Relations):** - Each created table represents one entity e.g. students, employees, customers, or products.
- **Rows (Tuples):** - Each row is a record in the table.
- **Columns (attributes):** - Each column represents a field or property of the entity.
- **Primary Key:** - This is a unique identifier for each row in a table.
- **Foreign key:** - A field that links one table to another.

Examples of relational database management system models include:

- Microsoft Access
- Microsoft SQL Server
- My SQL
- Oracle DB

### 9.1.5 Microsoft Access

- Microsoft Access is a Relational Database Management System (RDBMS) developed by Microsoft. It uses the relational model to store data in tables and allows users to create relationships between those tables.
- Microsoft Access is used to manipulate data organized in a small to medium-sized databases for personal or small business inventory, customer tracking or school records.
- This RDBMS is good for beginners and it doesn't require advanced programming skills to use it but it is not ideal for large scale, multi user or web-based databases.
- In this topic, we shall create and manipulate database tables using Microsoft Access.

## 9.2. Managing Simple Databases

Before we start creating and managing simple databases using Microsoft Access, we need to understand about database file name and its objects that are also given names. When you create a database file with its given file name, you have to know that within that database it will have objects such as Tables, Forms, Queries, and Reports.

The same database can have many tables, forms, queries, and reports known as objects, but each object must be identified with its own unique name within the database.

### 9.2.1. Table Design

A database table is a structured set of data organized in rows and columns within a database. In this section we shall learn how to create a database and eventually design table(s) within the database we have created.

#### Activity 9-1

You have been assigned a task to create a database for your school which can be used to store students details such as Admission Number, First Name, Last Name, Date of Birth, the level (ordinary or advanced), Contacts and Fee Paid. Each detail will represent the field name but every student's details will represent a record. You will create a database using the name **School Info** and then within this database you will design a table which you will give it a name **Student Details**. See **Table 9-1** below.

**Table 9-1:** *Student Details*

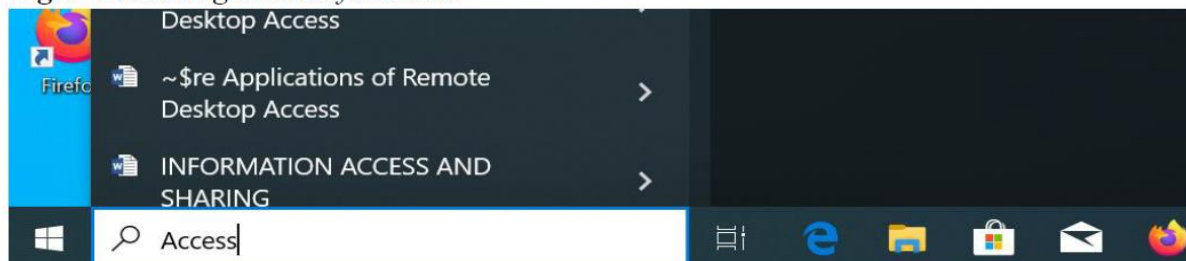
AdmNo	Fname	Lname	DOB	Level	District	Contact	FeePaid
A001	Musazi	Juma	12/6/2005	Advanced	Luwero	+256752765475	200000
A002	Kabi	Ally	29/4/2010	Ordinary	Kampala	+256774112354	300000
A003	Opio	James	3/7/2009	Ordinary	Gulu	+256782337556	500000
A004	Atim	Joy	23/8/2007	Advanced	Soroti	+256774543454	400000

### 9.2.2. Starting MS-Access

To create a new database file, you will carefully follow the steps below:

1. On your **Desktop** screen, move your mouse pointer at the bottom left side and click on **Type here to search** (if you are using Windows 10 and above). Type **Access**. See **Fig. 9-1** below. Else, if you are using **Windows 7**, click the **Start** button/**Microsoft Office/Microsoft Access 2016**.

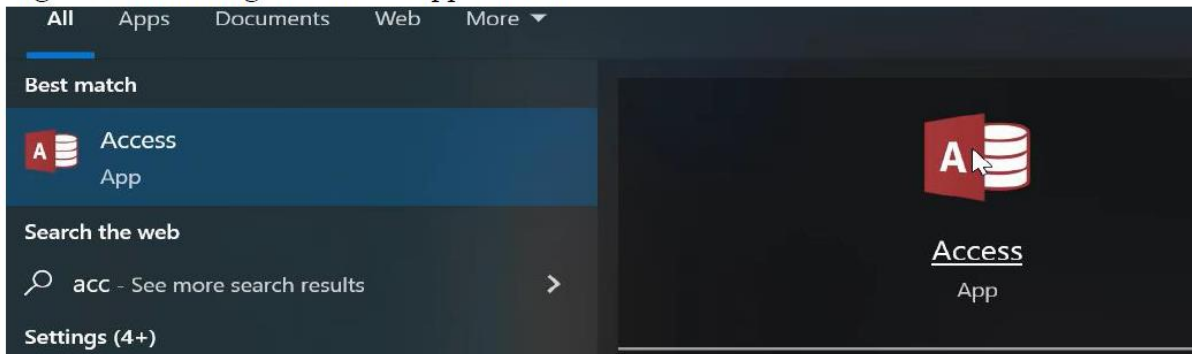
**Fig. 9-1:** *Starting Microsoft Access.*



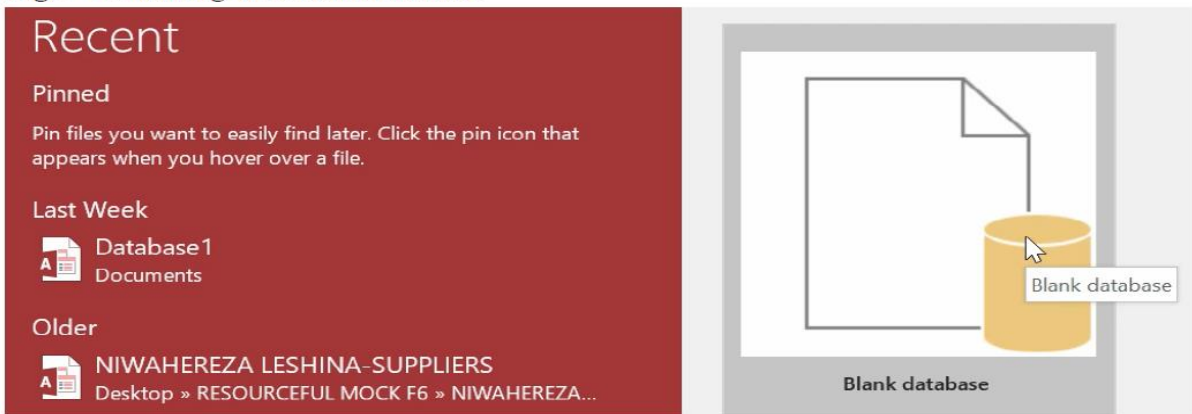
2. The **Access App** will be displayed at the upper right side of your **Desktop** screen. Move your mouse pointer and click it once. See **Fig. 9-2** below.

3. From the new interface, point and click **Blank database** as seen in **Fig. 9-3** below. The new interface will be displayed prompting you to type the new name of your database. See **Fig. 9-4** below.

**Fig. 9-2:** *Launching MS-Access Application*



**Fig. 9-3:** *Starting the Blank database.*



### 9.2.3. Saving Files in MS-Access

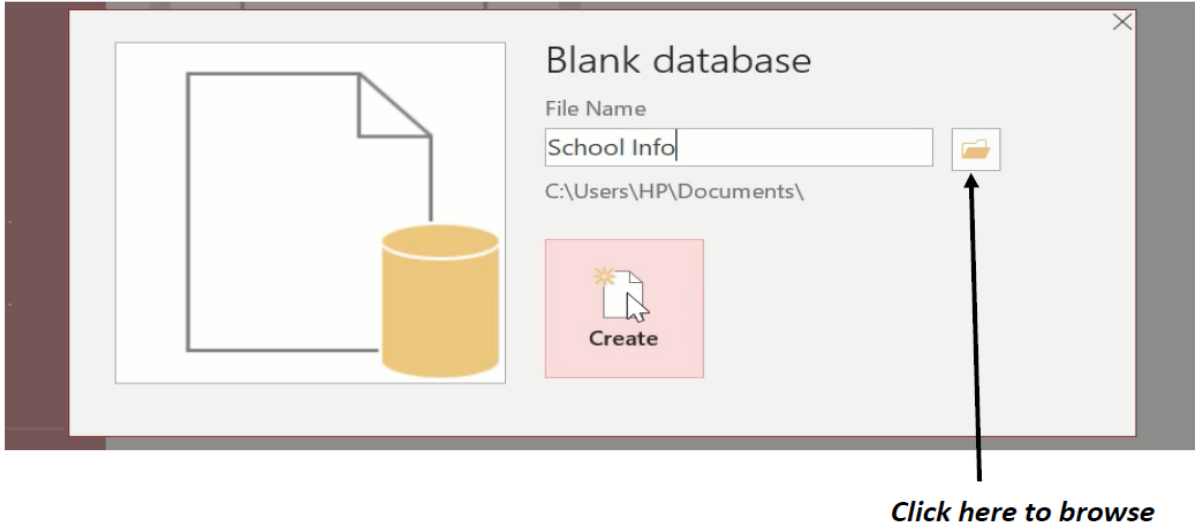
Unlike what you did in MS-Word, MS-PowerPoint, and MS-Excel, in MS-Access you cannot start editing the content of the file before saving it with a database name.

In MS-Access, you have to ensure that the database is created by its clear stated file name before it allows you to start designing objects within it such as tables, forms, queries or reports.

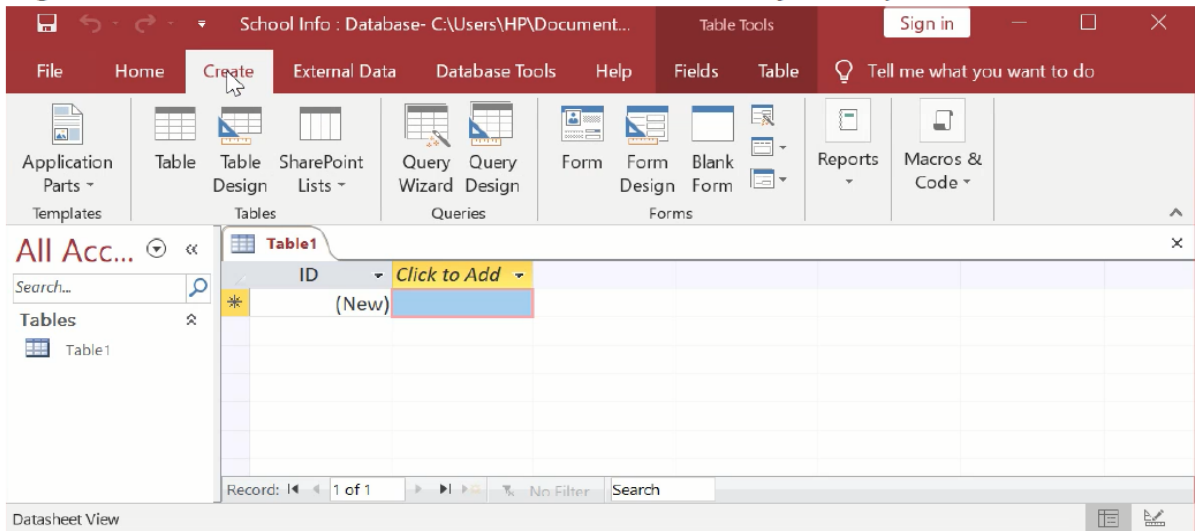
The moment you click **Blank database**, an interface will be displayed showing you a default file name as: **Database1**, or **Database2** and so on. If you click **Create** icon before typing your own file name, then your database will be given any of the displayed default names.

After typing your new file name, you may also browse by clicking the **browse** button such that you can save your file in the path/folder of your choice. If you don't browse to direct your file to the location where it should be saved, then it will be saved within **Document** folder.

**Fig. 9-4:** Typing the Database name before creating the file.



**Fig. 9-5:** The new Database has been created with **School Info** as its file name.



4. Erase the default name, **Database1** and type your own database name. In this case, **School Info** was typed as seen in **Fig. 9-4** above. Before clicking the **Create** button, you have the option to browse around to select the folder where you want you file to be saved.
5. After clicking **Create** once, your new database will be created showing the various features. See **Fig. 9-5** above. At the top of the interface bar it shows its database name that was typed before you clicked **Create** in **Fig. 9-4** above.
6. Move your mouse pointer and click **Create** from the menu bar. Several features will be displayed as seen in **Fig. 9-5** above.
7. Move your mouse pointer again and click **Table Design** icon which can be seen just below the **Create** option you have just clicked in **Fig. 9-5** above. The new table (**Table2**) will be displayed showing **Field Name**, **Data Type**, and **Description [Optional]** as seen in **Fig. 9-6** below.

**Fig. 9-6:** Shows New Table in Table Design View.



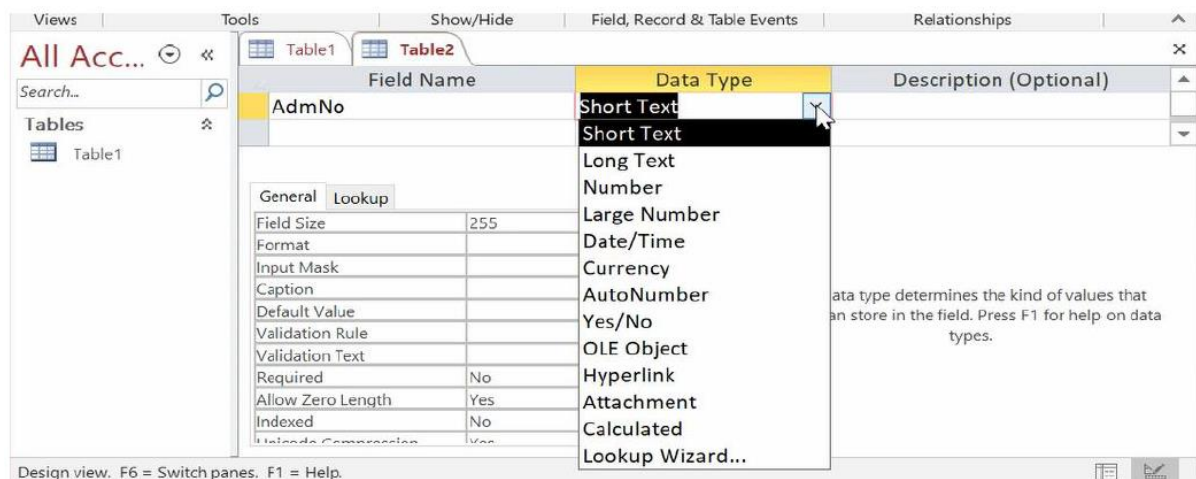
### 9.2.4. Field Names

Field names are the column headers in a database table. They define the type of data each column will store.

Example of field names in the student table seen in **Table 9-1** above are:

- **AdmNo** – This is the unique admission number for the student.
- **Fname** – Represents the first name of the student.
- **Lname** – Represents the last name of the student.
- **DOB** – Represents the date of birth of the student.
- **Level** – Indicate the level at which the student is studying.
- **District** – The district of residence of the student.
- **Contact** – Shows the parent’s contact of the student.
- **FeePaid** – This is the amount fee paid by the student.

**Fig. 9-7:** Shows a list of Data Types used in database table fields.



8. Start typing in the first field name, **AdmNo** under **Field Name** column. See **Fig. 9-7** above.

- Still in **Fig. 9-7** above, move your mouse pointer at the **Data Type** column and click to drop down a list of various data types.

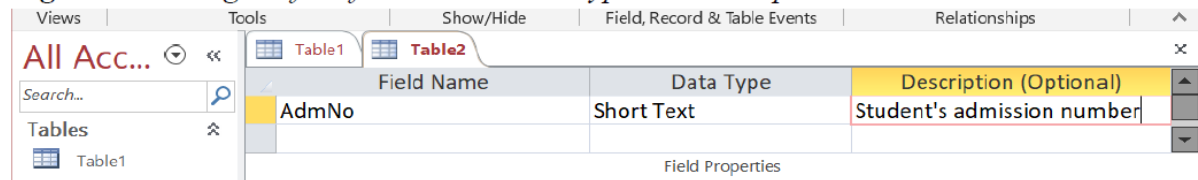
### 9.2.5. Data Types in MS-Access

Data type defines the kind of data that can be stored in a field (column) of a table. It helps ensure that only valid data is entered and also determines how the data can be used either in calculations, sorting, or filtering.

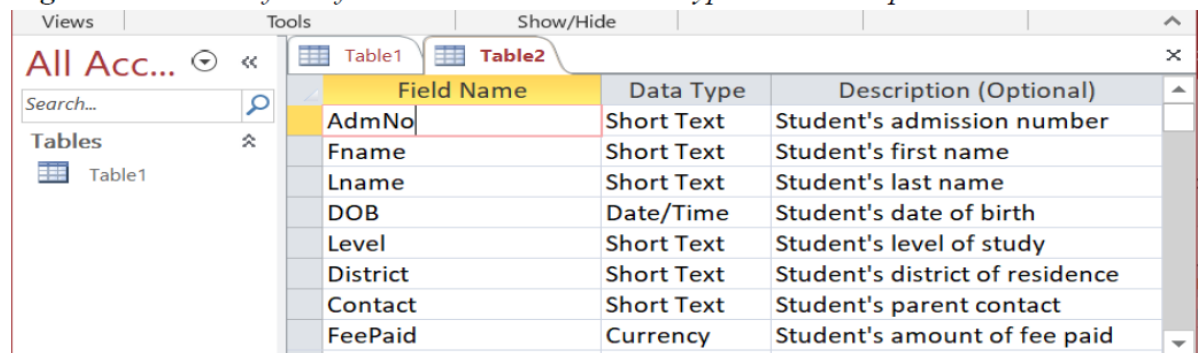
The data types used in MS-Access Data Management System include:

- **Short Text:** - This is used to store text or combinations of text and numbers (up to 255 characters).
- **Long Text (Memo):** - This is used in fields where detailed description is required.
- **Number:** - Stores numeric data used in calculations.
- **Date/Time:** - Stores date and time values.
- **Currency:** - Stores numeric values with monetary units.
- **AutoNumber:** - Automatically generates a unique number for each record.
- **Yes/No:** - Stores Boolean values (True/False or Yes/No)
- **OLE Object:** - Stores files like word documents, Excel files, or images.
- **Hyperlink:** - Stores links to websites or files.
- **Attachment:** - Used to attach files.
- **Calculated:** - Performs a calculation based on other fields.
- **Lookup Wizard:** - Allows the user to choose values from another table or list.

**Fig. 9-8:** Building the first field with its data type and description.



**Fig. 9-9:** Shows the filled field names with their data types and descriptions



### 9.2.6. Field Name Description

Field Name Description is an optional explanation you add to the field name when creating or editing the table in design view.

The real reason of describing field names is to enable future database reviewers to easily follow the purpose of each field, especially if it is abbreviated e.g. DOB for Date of Birth.

### 9.2.6. Primary Key Field.

A primary key is a field (or set of fields) in a database table that uniquely identifies each record in that table.

#### Features of Primary key

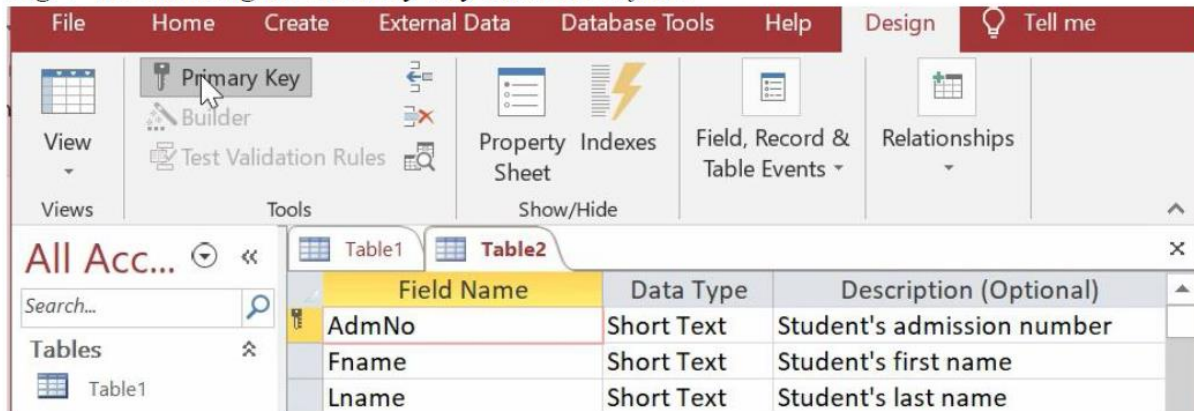
- **Uniqueness**, implying that no two or more records can have the same primary key value.
- **Not null**, meaning that a primary key field cannot be empty.
- **One per table**, that is, each table can have only one primary key.

For instance, in **Table 9-1** above, the **AdminNo** field can be made to be the primary key because its values must be unique. We do not expect students to share the same admission number. We only expect that you can have two or more students sharing the same name and therefore we can't make the field containing names a primary key.

For setting up the field to a primary key we can proceed with the steps as below:

10. Point and click **AdminNo** key field and then move your select **Design** from the menu bar. The new pane will be displayed. See **Fig. 9-10** below.
11. Move your mouse on the upper left side and click **Primary Key**. The padlock key symbol will be displayed behind the **AdminNo** field as seen in **Fig. 9-10** below.

**Fig. 9-10: Inserting the Primary Key on AdmNo field**



### 9.2.6. Data in Datasheet View

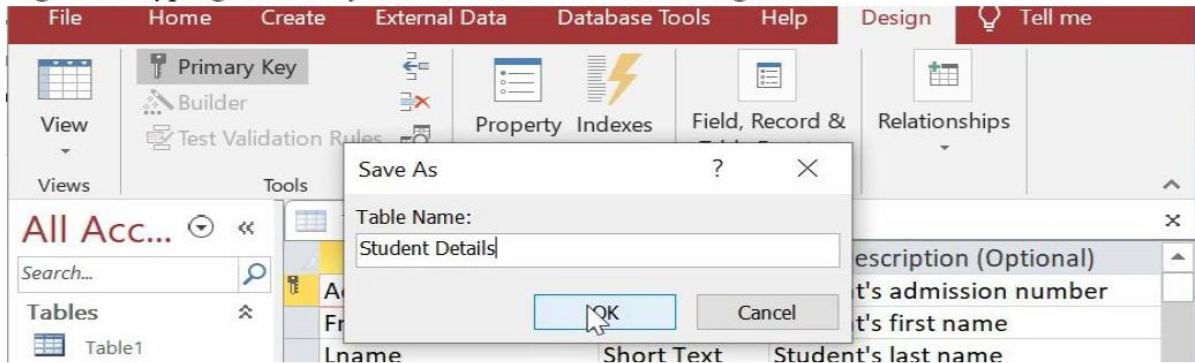
Database tables can be viewed in **Table Design View** or in **Datasheet View**. In **Table Design View**, we only view field names just like what you see in **Fig. 9-10** above, which in **Datasheet View** we can see the field names with their value entries. Before we view our table in **Datasheet View**, we first need to ensure that we have saved our table with a given name.

12. Move your mouse pointer at the left upper side and click the Save button once as seen in **Fig. 9-11** below. The **Save As** dialog box will be displayed as seen in **Fig. 9-12** below.
13. On the **Table Name:** type **Student Details** as seen in **Fig. 9-12** below and then click **Ok** once.

**Fig. 9-11:** Clicking the Save icon button to save the table design.

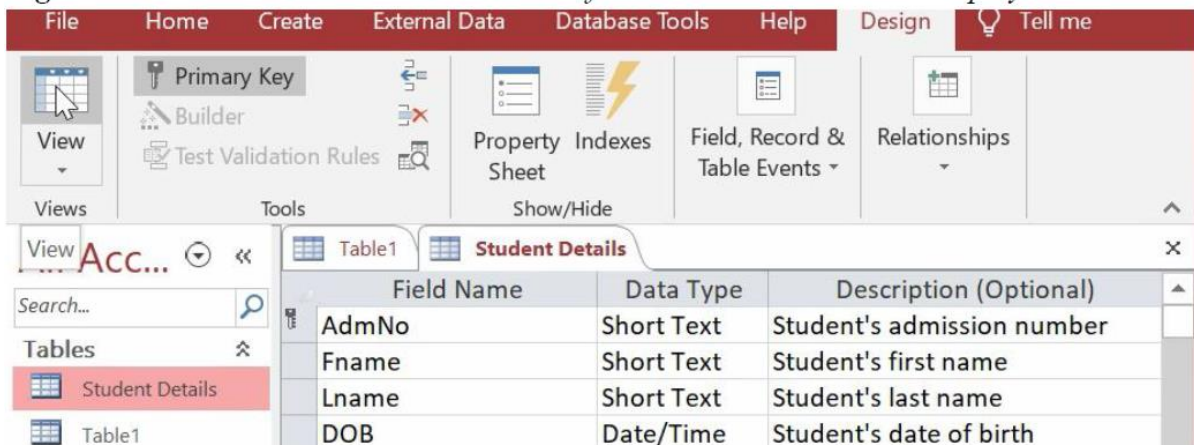


**Fig. 9-12:** Typing the table file name in the Save As dialog box.

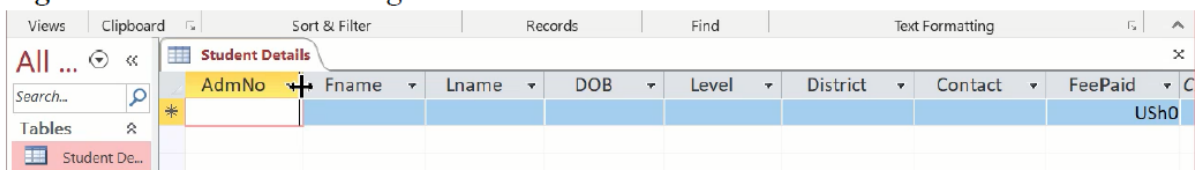


14. To view your table in **Datasheet View**, you can move your mouse pointer and click **View** on the upper left side as seen in **Fig. 9-13** below. The blank table in **Datasheet View** will be displayed prompting the user to start entering data. See **Fig. 9-14** below.
15. You can use data seen in **Table 9-1** to enter it in **Datasheet View** of the table you have just designed as seen in **Fig. 9-15** below.

**Fig. 9-13:** Shows the saved table with its new file name: **Student Details** displayed.



**Fig. 9-14:** Shows the new designed table in Datasheet View.



**Fig. 9-15:** Shows a table in Datasheet View with filled in data.

AdmNo	Fname	Lname	DOB	Level	District	Contact	FeePaid
A001	Musazi	Juma	12/06/2005	Advanced	Luwero	+256752765475	USh200,000
A002	Kabi	Ally	29/04/2010	Ordinary	Kampala	+256774112354	USh300,000
A003	Opio	James	03/07/2009	Ordinary	Gulu	+256782337556	USh500,000
A004	Atim	Joy	23/08/2007	Advanced	Soroti	+256774543454	USh400,000
*							USh0

### 9.2.6. Data Validation

- **Data validation** is the process of ensuring that a program operates on clean, correct and useful data.
- It uses routines called "**validation rules**" that check for correctness, meaningfulness, and security of data that are input to the system.
- **Validation text** is the display of a message that notifies the data entry clerk that the data entered in the field is not valid.

#### Validation Methods

Data can be validated using the following methods:

- Data type checks:** - Checks the data type of the input and give an error message if the input data does not match with the chosen data type, e.g., In an input box accepting numeric data, if the letter 'O' was typed instead of the number zero, an error message would appear.
- Format check:** - Checks that the data is in a specified format (template), e.g., dates have to be in the format DD/MM/YYYY.
- Presence check:** - Checks that important data is actually present and have not been missed out, e.g., customers may be required to have their telephone numbers listed.
- Range check:** - Checks that the data lie within a specified range of values, e.g., the month of a person's date of birth should lie between 1 and 12.
- Limit check:** - Unlike range checks, data are checked for one limit only, upper OR lower, e.g., data should not be greater than 2 ( $\leq 2$ ).
- Spelling and grammar check:** - Looks for spelling and grammatical errors.
- Uniqueness check:** - Checks that each value is unique. This can be applied to primary key field or fields that do not allow duplication.
- Consistency checks:** - Checks fields to ensure data in these fields corresponds, e.g., If Title = "Mr.", then Gender = "M".

#### Activity 9-2

**Kilimani Girls** prepared a student records sheet that has students from **S1** to **S4** which captures *Admission Number, First Name, Second Name, Student Class, Date of Birth (DOB), and Fee Paid* from each student. The school has hired you to design a database table which can capture the records from a sheet of paper to the computer. The data entry clerk of the school wants you to setup validation rules in some fields in order to minimize errors during data entry. The fields she selected are *Student Class* such that the field can only accept class entries of **S1, S2, S3, S4** but it should reject any other values because they do not have another level beyond that.

Next, is the *Date of Birth* entries where the date of birth for every child should be those who are born after **2005** and before **2012**. The school assumes no other dates of birth out of that range are admitted at school within that current year. Lastly, in the **Fee Paid** field, the fee entered should be 500,000 and above as of school policy. See **Table 9-2** below.

**Table 9-2: Fee Payment**

AdmNo	FirstName	SecondName	Class	DOB	FeePaid
KG001	Nakachwa	Rose	S3	12/4/2010	800000
KG002	Kitila	Bob	S2	16/7/2011	550000
KG003	Kayondo	Jane	S3	23/8/2010	600000
KG004	Makeke	Dan	S3	19/1/2010	700000

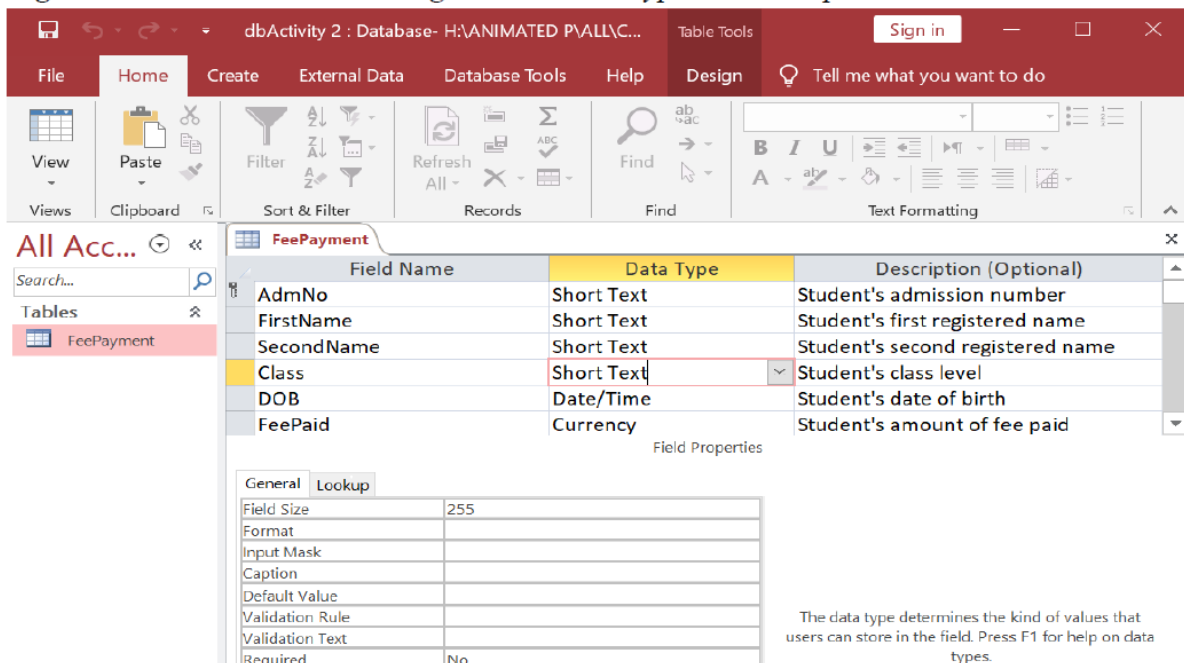
### Task

Design the database table for the school which can adhere to the above school needs and reequipments by imposing the stated validation rules and an appropriate validation text should be displayed if the stated rules get violated by any data entry clerk.

To setup the validation rules and eventually enter data you can follow the following steps:

1. You will open your MS Access program and then create a database by the name **dbActivity 2**.
2. Within the **dbActivity 2** database, design a table based on fields seen in the **Table 9-2** above and then allocate appropriate Data Types with their corresponding field description. See **Fig. 9-16** below.

**Fig. 9-16: Shows the table in design view – Data Types & Descriptions**



3. Move your mouse pointer and click **Data Type** of the **Class** field once. Then move down on the **Validation Rule:** and type: S1 or S2 or S3 or S4. Usually it will automatically turn to “S1” or “S2” or “S3” or “S4”. See **Fig. 9-17** below.

# THE TOPIC CONTINUES

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## TOPIC TEN

### Artificial Intelligence and Related Emerging Technologies

Artificial Intelligence (AI) is one of the most transformative technologies of the 21<sup>st</sup> century. It refers to the ability of machines to mimic human intelligence – such as learning, reasoning, problem solving, and decision making. AI systems are designed to perform tasks that usually require human intelligence, including speech recognition, visual perception, language translation, and more.

In addition to AI, several other emerging technologies are shaping the modern world. These include machine learning, robotics, Internet of Things (IoT), Blockchain, Quantum Computing, Big Data Analytics, and 3D printing. These technologies are interconnected and often work together to create smart, efficient, and automated systems.

Understanding AI and its related technologies is essential for students, as they are driving change in every sector – including education, healthcare, transportation, agriculture, and manufacturing. As these technologies continue to evolve, they are creating new opportunities and challenges, making it important to learn their applications, benefits, and ethical concerns.

In recent years, tech companies have worked harder to revolutionize the computing methods that had existed for decades by introducing the Artificial Intelligence applications. These web applications are now installable and able to be applied freely on PCs or mobile devices such as smartphones.

#### 10.1. AI and Related Concepts

- Artificial Intelligence (AI) is a specialty within computer science that is concerned with creating systems that can replicate human intelligence and problem-solving abilities.
- Artificial Intelligence enables systems to perform tasks such as learning, reasoning, problem solving, understanding language, and perception.

##### 10.1.1. Characteristics of AI

AI Systems are able to display human-like qualities and behaviors that can make individuals feel like they are interacting with a fellow human being. Some of these AI capabilities include:

- **Learning:** - AI systems are capable of acquiring new knowledge from data and experience that make them improve on their accuracy. The good examples are the Chatbots.
- **Reasoning:** - AI systems can make decisions by comparing information and choosing from the best options.
- **Problem Solving:** - AI systems can simulate human like thinking by analyzing problems from given data and find solutions quickly or even overcome challenges to achieve certain objectives.
- **Adaptability:** - AI can adjust to new situations or data without human guidance or intervention e.g. YouTube web system recommending new videos for web visitors based on what they like watching online.

- **Interaction:** - AI systems use Natural Language Processing to understand, interpret, and respond to human language using voice, text or images e.g. Virtual Assistants like Siri or ChatGTP.
- **Automation:** - AI systems can perform tasks without human input once trained e.g. robots working in a factory lines or AI in washing machines.
- **Perception:** - Some AI can see, hear, sense or understand like humans do, e.g. facial recognition, or speech to text systems.

### 10.1.2. Popular AI Apps

There are several AI applications and, in most cases, they have different functions. The most popular AI applications include:

1. **Chatbots and Virtual Assistants** which are used for conversation, writing, coding and more e.g. ChatGTP, Siri, Google Assistant, Alexa, Meta AI, etc.
2. **Generative AI Tools** which are best for generating images and videos from description of text e.g. DALL.E, Midjourney, Adobe Firefly, Sora (Open AI), etc.
3. **AI in Productivity** which is mostly applied in assisting of writing, summarizing, smart note taking and content generation e.g. Grammarly, Notion AI, Quillbot, etc.
4. **AI in Search Engines** which can understand user's intent, interpret full question or phrases, and predicts or suggests search terms to deliver more accurate and relevant search results e.g. Google Gemini, Microsoft Copilot, etc.

### 10.1.3. AI Prompts

AI prompts are instructions or questions given to an AI system to generate a response. It is a good prompt input that can determine the expected results. The type of AI prompts that AI users can create are:

- **Text Prompts:** - These are written instructions or questions given to AI like ChatGTP. For instance, you can create a text prompt as: *“Explain the solar system in simple terms”*.
- **Image Prompts:** - These are descriptions that are used to generate images as a response using AI. For instance, you can describe for AI an Image prompt such as: *“Draw a boy running on the road in heavy rain”*
- **Voice Prompts:** - This involves spoken commands or questions used with voice enabled AI such as Siri AI or Alexa AI.
- **Code Prompts:** - These are programming related requests to Code AI assistants to generate program codes that can solve specified problems. For instance, you can prepare a Code Prompt such as: *“Write a program code which can be used to add two integer numbers in Java language.”*
- **Creative Prompts:** - These are prompts that are used to generate things like poems, stories, songs, essays, or ideas. For instance, you can create a prompt such as: *“Write a story of a boy who was expelled from school because of escaping habits”*
- **Instructional Prompts:** - These are created commands for AI to complete a task step by step. For instance, you can put an instruction as: *“List down the steps for baking a cake”*.
- **Question Prompts:** - These can be questions used to gather facts or explanations. For instance, you can prepare a prompt such as: *“Why do plants need sunlight?”*

# THE TOPIC CONTINUES

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