Federal Democratic Republic of Ethiopia Ministry of Education

INFORMATION TECHNOLOGY STUDENT'S TEXTBOOK GRADE 8

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FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF EDUCATION

INFORMATION TECHNOLOGY

STUDENT'S TEXTBOOK

GRADE 8

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Preface

Information Technology (IT) is so important in the world today that it makes it imperative for every person to be competent in the use of IT for the many tasks that one will have to accomplish. It is with notion that this book is written to provide the basic skills in IT for Grade 8 students of the Federal Democratic Republic of Ethiopia. It is expected that the knowledge and skills gained through this book will help the students to use IT in almost all their subjects at school and in their everyday life. The book covers selected basic topics in IT, which offer hands-on activities to help students in acquiring the required IT skills. The key features of this book will help the students to:

- *describe the historical development of computer and its development from the earliest to the current periods,*
- *identify the generations of computer,*
- *identify computer hardware,*
- *identify the computer software,*
- *describe Internet services,*
- *describe computer ergonomics,*
- *program LOGO language.*

The textbook has been designed in a simple and user-friendly way. This text focuses on the fundamentals of IT, which change slowly. This does not only make the information remain useful to a student when one graduates, but also makes the student focus on the foundation concepts in IT. This textbook also illustrates the latest developments in the rapidly changing world of IT. Review questions have also been given at the end of each unit.

Suggestions for the improvement of this book will be gratefully acknowledged.

Table of Contents

UNIT

1 Basics of Computer

Unit Outcomes

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

- *identify computer generation;*
- *explain functions of the computer;*
- *explain types of computer;*
- *list characteristics of computer.*

Overview

In this unit, you will learn about basics of computer such as generations, functions, types and characteristics of computer. The evolution of computer is classified by its generations. The main functions of computer are taking, processing, returning results, and storing data. Computers are classified based on their size, storage and speed, methods of the operation, and purpose of the application. The characteristics of computer indicate the quality of a computer.

Brainstorming activity

- Define the term computer as you learned in grade 7.

1.1. Computer Generation

Brainstorming activity

Do you know the evolution of computer?

The term generation refers to the period of development of the computers. Computer generation is change happened in the development of computers. The evolution of computer is divided into generations. Each generation is characterized by a major technological development that changed the way computers operate. Initially, the term generation was used to distinguish hardware technologies. Nowadays, generation includes the changes in hardware and software. There are five computer generations. These are:

A. First generation
B. Second generation
C. Third generation
D. Fourth generation
E. Fifth generation

1.1.1. The First Generation (1940-1956)

The earliest generation of computer is the first generation. The first generation of computer used a vacuum tube for electric circuit. The vacuum tube was a basic component of the first generations of computer.

The first generation was large and very expensive computer, as shown in Figure 1.1. It needs high power of electricity and generates a lot of heat.

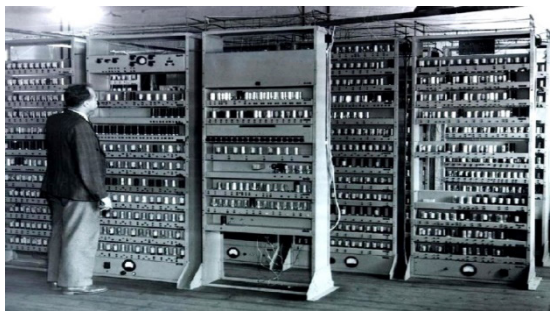
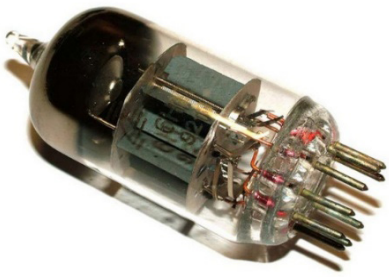


Figure 1.1. The First Generation of Computer

The first generation of computers used vacuum tube as a core of technology, as shown in Figure 1.2 below.



⚜ **Vacuum tube** is an electronic device that controls the flow of electrons in a vacuum.

Figure 1.2. Vacuum Tube

1.1.2. The Second Generation (1956-1963)

The second generation of computer used transistor as the basic component. **The transistor,** as shown in Figure 1.4 below, was invented in 1947 but was not seen widely spread to be used in computers until the late 1950s.

Figure 1.3. The Second Generation of Computer

⚜ **Transistor** is an electronic device used to control the flow of electricity in electronic equipment.

Figure 1.4 Transistors

1.1.3. The Third Generation (1964-1971)

The third generation of computer is a computer that emerged due to the development of the integrated circuit (IC).

The development of the IC was the characteristic of the third generation of computers.

Figure 1.5. The Third Generation of Computer

An IC refers to a small electronic device developed from semiconductor materials. An integrated circuit is the core of technology that is used in the third generation of computer, as shown in Figure 1.6 below.

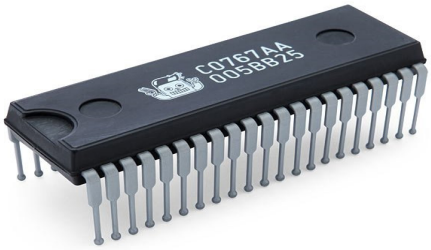


Figure 1.6. Integrated Circuit

⚜ **Integrated circuit** is an integrated system of multiple, small and interconnected components.

1.1.4. The Fourth Generation (1971-Present)

The fourth generation of computer is the progressive version of the third generation of computer, as shown in Figure 1.7 below.

The fourth generation of computer used very large scale integrated (VLSI) circuit. VLSI is the current level of computer microchip containing hundreds of thousands of transistors. It is more powerful, compact sized, reliable, and affordable generation of computer.

Figure 1.7. The Fourth Generation of Computer

The fourth generation of computer is suitable to have in the palm of the

hand. As a result, it gave rise to the revolution of Personal Computer (PC).

Figure 1.8. Microprocessor

⚜ **Very large scale integrated circuit** is the current level of computer microchip containing hundreds of thousands of transistors.

1.1.5. The Fifth Generation (Present and Beyond)

The fifth-generation of computer uses Artificial Intelligence (AI) applications such as robotics, game playing and natural language processing. The goal of the fifth generation of computer is to create machines that can learn and organize themselves. The development of the fifth generation of computer is intended to solve complex problems. The fifth-generation of computer has the ability to perform parallel data processing; which helps to develop AI applications. The parallel processing is used to enable the computer to achieve simultaneous data processing tasks to increase the mathematical calculation speed of a computer system. The parallel processing system can carry out simultaneous data processing to achieve a faster execution time. The primary purpose of parallel processing is to enhance the computer processing capability and increase the amount of processing accomplished at a given time interval.

⚜ **Artificial intelligence** refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.

Figure 1.9. Example of the Fifth Generation of Computer

Activity 1.1

- Discuss the time range of inventions and key differences between generations of computer in groups.

1.2. Functions of Computer

Brainstorming activity

- How do you associate the functions of computer in processing data with that of human mind?

There are four basic functions of computer. These are:

- Input
- Output
- Process
- Storage

1.2.1. Input

Input is a process of inserting data into a computer. A computer takes data from the user in order to process and store it. For example, to find the product of numbers, the computer first takes the numbers as an input from a user. The data can be entered into computer maybe by typing from keyboard, taking picture, using cameras and recording audios.

1.2.2. Processing

Processing is making some operations on the entered data. For example, a computer can take two numbers and calculate their sum. You can also take photo editing as an example. You can make change in colors, borders and brightness of your photo to make it more beautiful. Moreover, you can see your roster preparation. Computer can take the students' marks as input and calculate the average, select top students as well as total marks.

1.2.3. Output

Output is displaying the result obtained from processing to the users. The output can be displayed through monitor, speaker and printer.

For example, the printer can print the output of roster processing on paper.

1.2.4. Storage

Computer is used to store data. The storage can be a computer's internal or external storage. Storage usually occurs on a hard drive, flash drive, and a compact disk (CD). For example, you can save your photo on your mobile memory, videos on CD, and your roster on computer hard drive. The four basic functions of computer are presented in the Figure 1.10 below.

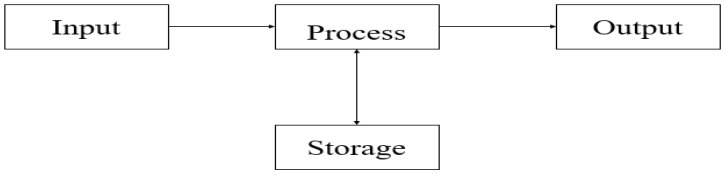


Figure 1.10 Functions of computer

Activity 1.2

- Discuss how computer works in a group?

1.3. Types of Computer

Brainstorming activity

- Do you know the types of computer?

Computers can be classified based on their size, storage, speed, methods of operation, and purpose of application.

I. Types of computer by their size, storage and speed

Based on their size, storage, speed there are four types of computer:

- Microcomputer
- Minicomputer
- Mainframe computer
- Supercomputer

1. Microcomputer

Microcomputer is a small sized computer used for general purpose. Microcomputers are the most widely used type of computers. They are small and fit on desktops, have varying capacity and easy to handle. Microcomputers are referred to as Personal Computers (PC). They have video display unit for output purpose. Data can be entered through the keyboard and stored on different storage devices such as removable disk, compact Disk (CD) and external hard disk.
Personal computers (PCs) are the popular form of such computers used by different individuals as well as organizations. The PCs are classified as:

A. Desktops: These are the computers whose case sits on a desk with its keyboard in front of it and its monitor often on top, as show in Figure 1.11 A. There are also desktop computers, which do not have separate system unit and monitor. Both system unit and monitor are integrated in one device, as shown in Figure 1.11 B below.

Figure 1.11: A. Desktop with a system unit and monitor **B. Desktop with IntegratedSystem unit and Monitor**

B. Portables:

These PCs are so small that they can be placed in a handbag. The difference between portables and desktops is that portables can be carried while traveling unlike desktops. The portables are also classified as:

i. **Laptops:** These small sized computers having the same power as a desktop. they are small enough to carry and designed for use outside an office, as shown in Figure 1.12.

Figure 1.12: Laptop

ii. **Notebooks**: These are smaller than a laptop and designed to overcome the drawbacks of a laptop. They have the size of a notebook but they are as powerful as a desktop, as shown in Figure 1.13.

Figure 1.13: Notebook

iii. Tablet: is a portable personal computer with a touch screen. A tablet is typically smaller than a notebook computer, but larger than a smartphone. A smartphone is a portable device that combines mobile telephone and computing functions into one unit. The touch screen display operates bya finger instead of the mouse, touchpad, and keyboard of larger computers, as shown in Figure 1.14.

Figure 1.14: Tablet

2. Minicomputer

Minicomputers are larger and more powerful than most microcomputers, but smaller and less powerful than mainframe computers. They are small and general-purpose computers.

Figure 1.15: Minicomputer

3. Mainframe Computer

Mainframe computers are large and powerful computers that are physically larger than microcomputer and minicomputer. These computers have processors with faster instruction processing speeds. Mainframe computers process data at very high rates of speed, measured in millions of instructions per second. Mainframes are designed for many users and can be used at a time and process vast amounts of data quickly. For example, banks, insurance companies, manufacturers, and airlines are typical users of these computers.

Figure 1.16: Mainframe Computer

4. Supercomputer

Supercomputer is a high-speed processing computer. A supercomputer is characterized by fastest speed, and most powerful capacity. This computer is capable of processing trillions of instructions per second. Supercomputers are largely used by research organizations, military defense systems, national weather forecasting agencies, large corporations, and aircraft manufacturers.

Figure 1.17: Supercomputer

II. Types of computer based on their methods of operation

Based on methods of operation, this category of computers has three types:

1. Analog Computer
2. Digital Computer and
3. Hybrid Computer

A.Analog Computer

Analog computer is a type of computer that was used to process continuous data. Analog computer was used in the 1950s and 1960s. It has limited memory and store less amount of data. It works with continuous data rather than discrete values. For example, analog computers used to process continuous values such as speed, temperature, pressure and current.

Analog computers directly accept the data from the measuring device without first converting it into numbers and codes. They measure the continuous changes in physical quantity and generally provide output as a reading on a dial or scale. Speedometer and mercury thermometer are examples of analog computers.

Figure 1.18: Analog Computer (Heartrate Monitor Machine)

B. Digital Computer

Digital computer was designed to perform calculations and logical operations at high speed. Digital computers transmit the data on a discrete value. It accepts the raw data as an input in the form of digits and processes it with programs stored in its memory to produce the output.

Figure 1.19: Digital Computer

C. Hybrid Computer

Hybrid computer has characteristics of both analog and digital computer. It is fast like analog computer and accurate like digital computers. It can process both continuous and discrete data. It accepts analog signals and converts them into digital form before processing. So, it is widely used in specialized applications where both analog and digital data is processed. A processor used in a petrol pump that converts the measurements of fuel flow into quantity and price is an example of hybrid computer. Similarly , it is also used in airplanes, hospitals, and scientific applications.

Figure 1.20: Hybrid Computer

III. Types of computer based on their purpose of application

Computers can be used for different purposes. Based on their application, they are classified as special purpose or general-purpose computers.

A. Special Purpose Computers

Special purpose computers are designed to solve a single problem. Their components and their functions are uniquely adapted to a specific situation involving a specific application.
Examples:

- The public telephone box
- Road Traffic control and safety system
- Ticket machines (for example in grocery and super market.)
- Pocket-calculators and
- Counters.

B. General Purpose Computers

General-purpose computers are designed to solve a variety of problems. They are programs or set of instructions designed to solve a problem. General-purpose computers are more flexible and versatile. Examples include:

- Microcomputers
- Minicomputers
- Supercomputers.

Activity 1.3

- Form a group and discuss the differences between ana log computer and digital computer based on the data they operate.

1.4. Characteristics of Computers

Brainstorming activity

- What are the major characteristics of computer?

Characteristics of computer indicate the qualities, limitations and features of a computer. There are various characteristics of computer depending on their size, capacity, and specifications.

Major characteristics of computer are:

- **Speed**: A computer works very fast and at high speed while performing mathematical calculations as compared to humans. For example, to perform mathematical calculations, the computers can process millions of instructions per second. The time taken by computers for their operations is microseconds and nanoseconds.
- **Accuracy**: Computers perform calculations with 100% accu-

racy. Errors may occur due to data inconsistency or inaccuracy.

- **Diligence**: A computer is free from tiredness. It does not feel any fatigue or lack of concentration.
- **Versatility**: refers to the capability of a computer to perform different kinds of works with same accuracy and efficiency.
- **Reliability**: A computer is reliable as it gives consistent result for similar set of data.
- **Automatic**: Computer performs all the tasks automatically i.e., it performs tasks without manual intervention.
- **Power of remembering:** Computer has the power of storing any amount of information or data. Any information can be stored and remembered as long as you require it, for a long period.
- **No IQ:** Computer cannot do any work without instruction from the user. Thus, it does not have IQ (Intelligence Quatient).
- **No Feeling:** Computer does not get tired even after long hours of work. Computer does not have a feeling or emotion, taste, knowledge and experience.
- **Storage:** Computer has a capacity to store a large amount of data. The Computer has an in-built memory where it can store a large amount of data.

⚜ **No Intelligence Quatient (IQ):** Computers cannot work by their own unless a set of instructions are given to it.

⚜ **No Feeling:** Computer does not have feelings and emotions. Although it has memory, it cannot work like a human brain.

Summary

In this unit, you have learnt about generations, functions, types and characteristics of computers. The following points are summary of this unit.

- Computer is an electronic device, which accepts instructions in order to perform certain tasks.
- The evolution of computer is defined in terms of the five generations of computer.
- Each generation of computer is categorized based on a new technological development, low price and small size, more powerful operation, fast speed and functionality.
- A smartphone is a portable device that combines mobile telephone and computing functions into one unit.
- There are four basic computer functions: accepting input, processing, providing output and storing data.
- Computers can be classified based on: size, methods of operation and purpose of application.
- Types of computer based on size are microcomputer, minicomputer, mainframe computer and super computer.
- Types of computer based on method of operation are analog, digital and hybrid computer.
- Types of computer based on purpose of application are special purpose and general-purpose computer.
- Characteristics of computer are speed, accuracy, diligence, versatility, reliability, automation, power of remembering, no IQ and capacity to store more data.

Review Questions

Part I: Say "True" if the statement is correct and "False" if it is incorrect.

1. A supercomputer is the fastest, most powerful, and most expensive type of computer.
2. The computers that used transistors are called the First Generation Computers.
3. The third generation computers used integrated circuits.
4. Personal computers are also called microcomputers.
5. Computers provide a perfect and accurate result even when wrong data is entered.

Part II: For each of the following questions choose the correct answer.

1. The acronym PC stands for:
   - A. Private Computer
   - B. Personal Computer
   - C. Personal Compact
   - D. All
2. Which one is the most powerful type of computer?
   - A. Minicomputer
   - B. Microcomputer
   - C. Mainframe computer
   - D. Supercomputer
3. _____ is the way a computer accepts data from the user a
   - A. Input
   - B. Process
   - C. Output
   - D. Storage
4. Which one is not a characteristic of computer?
   - A. Versatility
   - B. Reliability
   - C. Analog
   - D. Storage
5. Computers are designed to solve a single problem.
   - A. General purpose
   - B. Supercomputer
   - C. Special purpose
   - D. All

Part III: Match column "A" with their corresponding description stated under column "B".

A	B
1. Artificial Intelligence	A. First Generation
2. Integrated Circuits	B. Second Generation
3. Vacuum Tubes	C. Third Generation
4. Transistors	D. Fourth Generation
5. Microprocessors	E. Fifth Generation

Part IV: Read the statements and fill the blank space.

1. The evolution of computers is mainly divided into _____ main generations.
2. Each new generation of computers resulted in decrease in _____ and _____.
3. The computers that used _____ were called the first generation computers.
4. _____ computer generation will have the power to learn and apply knowledge to solve a problem.
5. _____ has characteristics of both analog and digital computers.

UNIT

2 Computer Hardware

Unit Outcomes

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

- *explain hardware components of computer;*
- *identify input, output, storages and processing devices ;*
- *explain functions of input, output, storages devices processing.*

Overview

In this unit, you will learn about hardware categories based on information processing such as input, output, storage and processing devices and their functions. Computer system is composed of computer hardware and software. Computer hardware is the physical part of a computer that we can see by our naked eyes and touch by our hand. It is divided into four categories based on information processing; input, processor, storage and output devices.

Brainstorming activity

- Do you recall the components of computer hardware that you learned in Grade 7?

2.1. Input Devices

Brainstorming activity

- Before we start our lesson today, can you list input devices? And discuss what is the function of each devices?

Input devices are computer hardware that are used to enter a data to the computer. they convert the data into the form that can be understandable by a computer as 0 and 1. The following are some of input devices:

- Keyboard
- Mouse
- Scanner
- Optical Recognition Systems
- Optical Speech Recognition
- Joystick
- Light Pen
- Touch Screen

A. Keyboard

Keyboard is an input device which has keys that enable one to enter data into a computer.

Figure 2.1: Keyboard

The keys on the keyboard can be divided into several groups based on their function as follows.

1. **Escape Key (ESC):** Esc is a key found on the top-left corner of a computer keyboard. It allows the user to cancel, or close an operation.

2. **Backspace Key:** The back space key is a keyboard key that deletes any character before the cursor›s current position.

3. **Function keys:** The function keys are used to perform specific tasks, for instance F1 is mostly used as the help key.

4. **Navigation and Editing Keys:** These keys are used for moving around in the documents. They include the arrow keys, Home, End, Page Up, Page Down, Delete, and Insert buttons.

5. **Typing (alphanumeric) keys:** These keys include letters, numbers, punctuation marks, and symbol keys found on a traditional typewriter.

6. **CTRL Key:** These keys are used alone or in combination with other keys to perform such tasks as bold, italic, underline, save, copy, cut and paste.

7. **Windows Key:** Most keyboards have the **Windows** key near the **Ctrl** key. If you tap the **Windows** key, it opens the **Start Menu.** Then press the Windows key again to close the Start Menu. In addition Windows key with others keys perform different activities, for example, Windows logo key plus **D** display the desktop, Windows logo key plus **E** open computer and Windows logo key plus L lock your computer or switch users.

8. **ALT Key:** The alternate key provides alternate input and operations when pressed in combination with other keys.

9. **Directional Keys:** There are four keys on a computer keyboard with arrows up, down, left, and right.

10. **Numeric Keypad:** The numeric keypad is used for entering numbers quickly. The keys are grouped together in a block like calculator or adding machine.

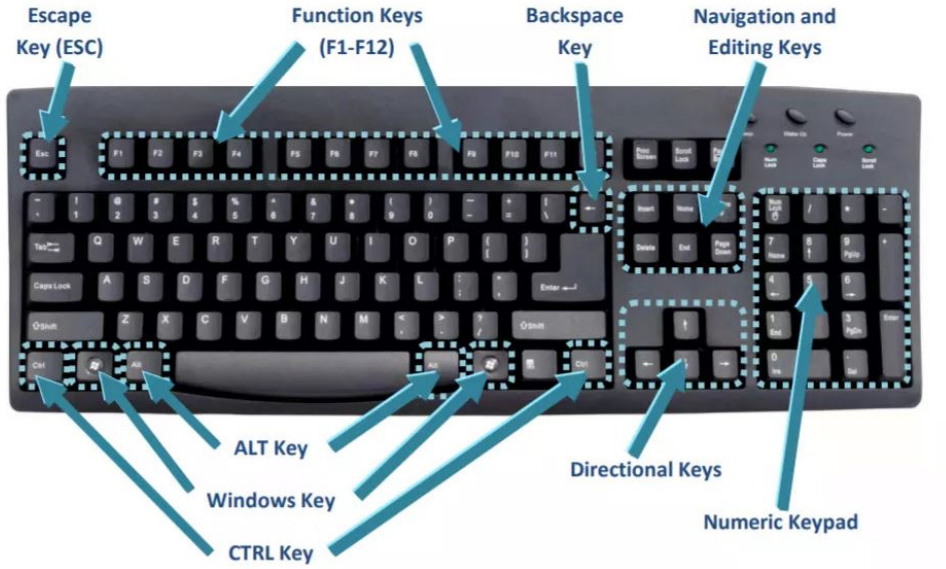


Figure 2.2: Parts of Keyboard

B. Mouse

Mouse is a hand operating device which controls the movement of the cursor or pointer. Its name is derived from its shape, which looks like a bit a mouse. The mouse are commonly has three buttons.

1. Left-button: used for left click. e.g. to select text
2. Right-button: used for right click. e.g. to see the property of the file
3. Middle button: used for scrolling purpose. This button is sometimes missing.

Figure 2.3: The mouse buttons

Mouses are connected to the system unit by a cable (wire) or by wireless. The wireless is also called cordless mouse or wireless mouse. The mouse pad is a pad on which you can move a mouse.

C. Scanner

Scanner is an input device that accepts printed text, handwriting or an object and converts it to a digital document.

It is used to input data directly into the computer from the source document without copying and typing the data. The input data to be scanned can be a picture, a text or a mark on a paper.

Figure 2.4: Scanner

D. Optical Recognition Systems (ORS)

ORS uses light to read characters, codes, and marks. It converts them into a computer understandable format 0 and 1. There are many types of optical recognition systems.

1. Optical Character Recognition
2. Optical Mark Recognition
3. Barcode Reader

1. Optical Character Recognition (OCR)

OCR device is a scanner that reads typewritten, computer printed, and in some cases hand written characters from ordinary documents. It scans the shape of the characters and compares it with predefined font shapes found in memory. It can convert the characters into computer code comparison. It is used to enter documents found on paper into computer without the need to type it using a keyboard.

Figure 2.5: Optical Character Recognition

2. Optical Mark Recognition (OMR)

OMR device senses the presence or absence of a mark such as pencil marks. It does not identify letters of the alphabet, instead, it uses electronic scanners, marks and symbols. It converts marks and symbols into appropriate electronic signals.

OMR is used to correct exams. The read mark is interpreted and matched against previously entered answer key. For example, Ethiopian School Leaving Certificate Examination (ESLCE) is corrected using this device.

Figure 2.6: Optical Mark Recognition (OMR)

3. Barcode Reader

Barcode reader is used to read barcodes printed on products. There are different kinds of barcodes; the most commonly used one is called Universal Product Codes (UPC). It is used to identify product manufacturer and product number; for instance, they are found in library management and inventory control management.

Figure 2.7: a. Barcode b.Barcode Reader

E. Speech Recognition System (SRS)

SRS is the ability of computers to recognize human speech. The microphone is used to enter the speech into a computer. The computer then processes the speech and performs the action ordered by speech. It is used to enter the data using speech instead of typing from keyboard. This makes data entry very easier. It is the latest technology and is still under research.

F. Light Pen

Light pen is a light sensitive device used together with a computer monitor. It is us ed by touching the screen with this device when creating or modifying graphics. A light cell at the tip of the pen senses light from the screen to determine the pen's location on the screen.

Figure 2.8: Light Pen

G. Touch Screen

The touch screen allows us to enter data by using finger. Touch screen is useful alternative to use a mouse or keyboard.

It is used on a variety of devices, such as a laptop, smartphone and tablet. Touch screen is generally used in applications like Automated Teller Machine (ATM), public information computers hospitals, airline reservation and railway reservation.

Figure 2.9: Touch Screen

H. Joystick

Joystick is a device which is commonly used for playing video games.

Joystick is mainly used to control the speed of the cursor and is thus popular in games involving speed like racing and flying games. The direction of push of the stick and the amount of deflection determines the change in the position and the change in speed, respectively.

Figure 2.10: Joystick

Activity 2.1

- Name at least three input devices and state its function?

2.2. Processing Devices

Brainstorming activity

- What do you mean when we say process devices? What do they do?

When a computer receives data from an input device, for example from the mouse or keyboard, the data must be processed before it goes to an output device, such as the printer or monitor. A processing device is used for converting that data into useful information. For instance, Central Processing Unit (CPU) is a type of processing device. It is also called a processor. It is like the brain of the computer.

It performs instructions in response to commands. A processor's speed is measured in hertz (Hz). Hertz is the standard unit used to measure the processor speed. One Hz means one cycle per second.

Figure 2.10: Central Processing Unit

The CPU performs instructions and the computer's processing activities. It functions the same purpose as the human brain. It is called the brain of the computer.
The CPU has three sub-components.

1. Control Unit (CU)
2. Arithmetic Logic Unit (ALU)
3. Memory (Registers) Unit

The three sub-components are connected by a cable called a bus. It facilitates communication between the parts. It is used to transfer data between these sub- components.

1. Control Unit

As the human brain controls the body, control unit controls the computer. Control unit does not perform the instruction by itself. It does not carry out instruction, but it directs other processing elements to perform the instruction.

2. Arithmetic Logic Unit

Arithmetic Logic Unit (ALU) is used to execute instructions. It performs two operations, namely Arithmetic and Logic operations.

Arithmetic operation is a mathematical operation like addition, subtraction, multiplication, and division. For example; if you give your computer the instruction 2+3, this is included in arithmetic operation and it is performed by Arithmetic Unit.

Logical Operation is concerned with the comparison of data. It includes operators such as less than (<), greater than (>), equal to (=), less or equal to (<=), greater or equal to >=).

3. Memory unit (Registers)

When instruction is loaded from a main memory, it is placed first in registers to wait instruction from the control unit. Registers are temporary storage location for data prior to performance in ALU.

2.3. storage devices

Brainstorming activity

- Have you ever used storage devices? If so, could you describe the devices you used?

A storage device is any type of computer hardware that is used for storing files. There are two types of storage devices. These are primary and secondary storage devices.

2.3.1. Primary Storage devices

Primary storage refers to the main storage of the computer or main memory. It is used to stores program instructions and data. There are three types of primary memory.

- Random Access Memory ;
- Read Only Memory;
- Complementary Metal Oxide Semiconductor.

1. Random Access Memory (RAM)

RAM is used to store data temporarily. It is also called read-write memory or main memory or primary memory. The programs and data that the CPU needs during the performance of a program are stored in this memory. It is a volatile memory. The data on the RAM is lost when the power is turned off.

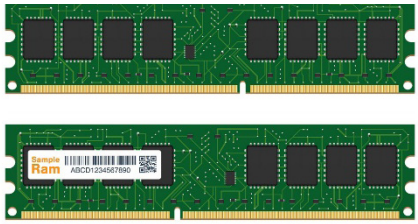


Figure 2.11: Random Access Memory

2. *Read-only memory (ROM)*

ROM stores information permanently. It has a software program built into it at the factory. It could not be changed or erased by the user but read.

It is non-volatile, i.e., once the data is stored in the memory cannot be modified or deleted read-only.

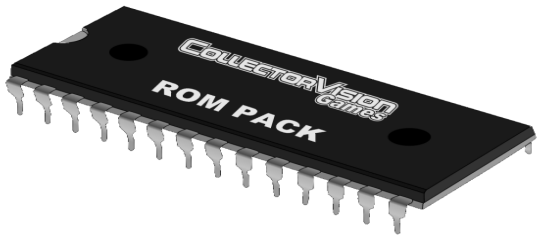


Figure 2.12: Read-only memory

The ROM contains special instruction that the computer uses when it is turned on, for example, the instruction that starts the computer and displays information on the screen.

3. Complementary Metal Oxide Semiconductor(CMOS)

CMOS is used to store information when a computer shuts off. It is found in several types of electronic components including CPU, and digital camera.

2.3.2. Secondary Storage Devices

Secondary storage devices are also called auxiliary storage. Secondary storage is a memory that is stored external to the computer. It is mainly used for permanent and long-term storage of programs and data. Secondary storage includes magnetic tape, magnetic disk and optical disk tape punched cards, and punched paper.

Magnetic Tape

The magnetic tape was the primary method of storing large amount of data during the 1950s and 1960s. Today they are used primarily for data backup purposes.

Data backup is a data that is stored in a different place than the original computer. This is to avoid the danger of data loss due to disasters. If the original data is lost, the copy will be used.

It consists of thin ribbon plastic called tape. One side of the tape is coated with iron-oxide.

It stores the data by magnetizing and demagnetizing the tape.

Magnetic Disk

Magnetic disk is the most widely used storage medium on all computers. It consists of a round piece of plastic or metal the surface of which is covered with magnetic material. It allows random access of information and solve problem of slow access time commonly found in tape files. For example: Hard disk.

Figure 2.14: Hard Disk

Hard disk is a magnetic disk made up of metal which can be fixed in the system unit of the computer. It serves as a secondary storage and enables very fast accessibility of data. Each disk is subdivided into tracks and sectors on which the information is stored.

Optical Disk

Optical disk uses laser light to read or write data. They use high powered laser light to burn on the surface of the disk to store data. The burned-out part is called the **pit**, and the non-burnt part is called **land**. Land may represent **0** while pit represented by **1**. Compact Disc (CD) and Digital Versatile Disc (DVD) are the two most common types of optical disks.

i. Compact Disc (CD)

The CD can store 700 MB of information. Data is stored only on one side of the disc. There are three basic types of CDs.

- Compact Disc Read Only Memory (CD-ROM)
- Compact Disc Recordable (CD-R)
- Compact Disc Read-Write (CD-RW)
- Compact Disc Read Only Memory (CD-ROM)

CD-ROM is read only type of CD, i.e. we cannot write data on such CDs or you cannot erase data from it. The data are only accessed or read from these CDs.

Compact Disc Recordable (CD-R)

It is also called Write Once and Read Many (WORM). These kinds of CDs can be written on once. But then after, you cannot rewrite on it or erase data from it. After you first write data on such discs, then the only thing you can do is to read data from them.

Compact Disc Read-Write (CD-RW)

CD-RW is also called erasable optical disc. You can write data as many times as you want on such CDs. You can also erase or delete data from such CDs.

Digital Versatile Disc (DVD)

DVD stands for Digital Versatile Disc. But some people mistakenly call it Digital Video Disc.
It is a new technology that is introduced recently. It is similar to CD except that it can store large amounts of data and it has narrow tracks than CD. It can store 4.7-17GB of information.

Activity 2.2

- List different types of storage devices and explain each of them.

2.4. Output Devices

Brainstorming activity

- What is the function of output devices? Discuss with your classmate.

The output devices are used to get data out of a computer. They convert information from computer understandable form to a human understandable form, either in soft copy or hard copy. For example; soft copy is displayed by the monitor and projector where as hard copy is printed using printer. Monitor, printer, plotter, projector, speakers, headphones and braille reader are some of the output devices.

Monitor

The monitor output device is used for displaying output to the user. The monitor is the most frequently used output device. It consists of a display surface called screen. The following are types of monitor.

1) Cathode Ray Tube (CRT)
2) Liquid Crystal Display (LCD)
3) Light Emitting Diode (LED)
4) Gas Plasma Monitor (GPM)

1. Cathode Ray Tube Monitor (CRT)

CRT is a technology used in traditional computer monitors and televisions.

Figure 2.15: An example of computer using CRT monitor

2. Liquid Crystal Display (LCD)

Liquid crystal display is the most commonly used device in digital watches, clocks, calculators, smartphones, desktop computers, laptops, and television.

Figure 2.16: An example of television using LCD

3. Light Emitting Diode (LED)

LED stands for Light Emitting Diode. LED monitor, sometimes called LED-backlit monitors, have great color and image quality, but it does not have a good response time.

It is a flat screen computer monitor, which stands for light-emitting diode displa It is lightweight in terms of weight. Nowadays, a wide number of electronic devices, both large and small devices such as laptop screens, mobile phones, TVs computer monitors, tablets, and more, use LED displays

Figure 2.17: An example of television using LED

4. Gas Plasma Monitor

Gas plasma monitor (GPM) uses neon gas instead of liquid crystal. The neon gas glows and produces the pixels or dots that form picture. It is used in older portable computers and television.

Figure 2.18: An example of television using gas plasma monitor

Printer

The printer is an output device that enables us to produce a hard copy of data or information. It has different speed, capabilities, and printing methods. Printers are divided into two classes based on the way they print.

1. **Impact printers,** e.g. Dot-matrix Printer and Daisy-wheel Printer
2. **Non-impact printer,** e.g. Ink Jet Printers, Laser Printer and Thermal printers.

Figure 2.19: Printer

Plotter

Plotter is used to produce high-quality drawings such as bar charts, maps and banners. It produces high quality multi-color documents on larger size papers which most printers cannot handle.

Figure 2.20: Plotters

Activity 2.3

- Make a group; list out output devices and discuss their function with your group members.

Summary

In this unit, you learned about computer hardware components such as input, output, processing, and storage.

- Input devices are any computer hardware equipment used to enter the data to the computer.
- Input devices are keyboard, mouse, scanner, micro phone, electronic whiteboard, optical mark recogni tion, optical character recognition, punch card reader, barcode reader, joystick and pen input.
- The output devices are used to get data out of a computer.
- Monitor, printer, plotter, projector, speakers, head phones and braille reader are some of the out put devices
- Central processing unit (CPU) is the brain of computer which performs computer instructions.
- CPU has three subcomponents

Review Questions

Part I: Read the following statements and say "True" if the statement is correct and "False" if it is incorrect.

1. The speed of CPU is measured in only Megahertz.
2. CPU stands for Control Processing Unit.
3. Central Processing Unit acts as the brain of the computer.
4. Control unit performs Logic Operation.
5. Register is temporary storage location for data prior to execu tion in Arithmetic Logic Unit.
6. Random Access Memory (RAM) contains essential information that is required when the computer is turned on.
7. DVD stands for Digital Video Disc.
8. Magnetic disk is the primary storage device.
9. Random Access Memory is the secondary storage device.
10. DVD store large amounts of data than CD.

Part II: Choose the correct answer for each of the following questions

1. _____ allows you to enter data into a computer in the form of text.

   A. Mouse C. Peripheral devices
   B. Keyboard D. Monitor

2. _____ is an output device.

   A. Mouse C. Joystick
   B. Monitor D. None

3. _____ keys are present on the top row of the keyboard.

A. Function C. Numeric

B. Typewriter D. Navigation

4. A light sensitive device that converts drawing, printed text or other images into digital form is_____.

A. Keyboard C. Scanner

B. Plotter D. OMR

5. Which of the following groups consists of only input devices?

A. Mouse, Keyboard, Monitor
B. Mouse, Keyboard, Printer
C. Mouse, Keyboard, Plotter
D. Mouse, Keyboard, Scanner

6. Which of the following is not an example of hardware?

A. Scanner C. Monitor

B. Printer D. Word Processing

7. The device that allow you to enter information into the computer.

A. Input C. Type

B. Output D. Print

8. Which of the following is not an output device?

A. Plotter C. Scanner

B. Printer D. Monitor

9. The most common method of entering text and numerical data into a computer system is through the use of a _____.

A. Plotter C. Printer

B. Scanner D. Keyboard

10. Which one of the following optical recognition systems senses the presence or absence of a mark, such as pencil marks?
    A. Optical Character Recognition
    B. Optical Mark recognition
    C. Barcode Reader
    D. None

11. The device that is primarily used to provide hardcopy is _____.
    A. CRT
    C. Printer
    B. Computer Console
    D. Card Reader

12. _____ converts information from machine-understandable form to a human understandable form.
    A. Input
    C. CPU
    B. Output
    D. Storage

13. Which of the following is not a type of monitor.
    A. Cathode Ray Tube
    C. Plasma Display
    B. Liquid Crystal Display
    D. None

14. _____ is most commonly used in digital watches, clocks and calculators.
    A. Cathode Ray Tube
    C. Plasma Display
    B. Liquid Crystal Display
    D. None

15. _____is a device that enables us to produce a hard copy of data/information.
    A. Printer
    B. Dot-matrix Printer
    C. Daisy-wheel Printer
    D. None

UNIT

3 Computer Software

Unit Outcomes

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

- *define operating system, utility and driver software;*
- *demonstrate skills in creating, saving, and formatting word processing document;*
- *demonstrate skills in creating, saving, and formatting spreadsheet;*
- *demonstrate skills in creating, saving, and formatting power point.*

Overview

In this unit, you will learn about operating system, word processor, spreadsheet and power point. The formatting of word processor, spreadsheet and power points are also discussed. The demonstrations of word processor, spreadsheet and power point are presented in this unit. Operating system, utility and driver software also addressed here.

Brainstorming activity

- What application software are you familiar with?

3.1. Operating system

Brainstorming activity

- What do you notice about the operating system you learnt in grade 7?

The operating system (OS) is software that communicates with the hardware and allows other programs to run. OS is system software that manages computer hardware and software. It performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices. It also provides common services for both hardware and software. The applications require an OS to be functional. Examples of operating systems are Windows, Mac OS, Ubuntu, Unix and Linux.

3.2. Utility Software

Brainstorming activity

- Do you know utilities software?

Utility software is system software used to solve a particular problem of a user. It is included in operating systems as well as separately available as a products like anti-virus. The purpose of utility software is to manage tasks associated with the configuration, performance and maintenance of a computer system. In other words, utility software is usually used to manage system resources. For example, utility software helps to perform backup, restore and anti-virus installations. Operating system provides different types of utility software to resolve common issues of software and hardware. Some of the utility software are system utilities, storage management utilities, file management utilities and miscellaneous utilities

A. System Utilities: Some of the system utilities are:

- Anti-virus
- Diagnostic programs and
- Network utilities

A. Storage Management Utilities: Some of the storage management utilities are:

- Backup software
- Disk formatters and
- Disk partition editors

A. File Management Utilities: Some of the file management utilities are:

- Data recovery
- Data compression and
- Data conversion

Activity 3.1

1. List and explain some of the system utilities, storage de vices, management utilities, and file management utilities.
2. Download and install Avast anti-virus software on the computer in the laboratory.

3.3. Driver Software

Brainstorming activity

- How does a computer recognize a printer?

Driver software is a type of software that controls hardware devices such as microprocessor, memory, hard drive, and peripherals devices. The hardware devices use driver software to send and receive information with other devices. The purpose of driver software is to allow the peripheral devices to communicate with the operating system. For example, printer driver is used to connect printers with the operating systems. The modern computer is connected with peripheral devices without physical connections using wireless and Bluetooth technology.

3.4. Application Software

Brainstorming activity

- What does applications software use to edit photo, browse and play music?

Application software is a computer program designed to help users to perform an activity. It is an application used to manipulate text, numbers, audio, graphics, and a combination of these elements.

Figure 3.1: Some of applications software.

Application software has a specific purpose that is used for particular tasks such as photo editing, an accounting application, a web browser, a media player, a flight simulator and game.

Activity 3.2

- Do you think that road traffic and safety light system, and Automated Teller Machine (ATM) in your village need software to work. Discuss in groups and present to your class.

3.5. Word Processor

Brainstorming activity

- Have you ever used word processor to edit files?

Word processor is a software that is capable of creating, storing, and printing documents. It helps to create a document and make any changes anywhere in the document. The document saved for later use is opened on another computer when needed.

Features of Word Processor

I. Create Document

When word processor is clicked on, a blank document window appears. Therefore, when a new document is created, its default name will be displayed with the name DOCUMENT <number>, as it shown in Figure 3.2 below.

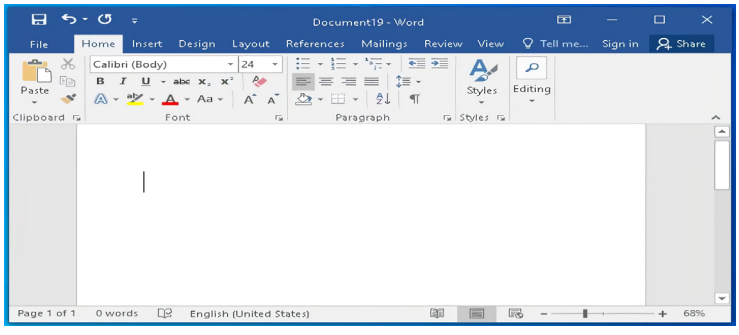


Figure 3.2 New Word Document File Created

II. Saving Document Using Save As

Once a document is created, it can be saved for future use. To "**Save as**" means to preserve the document for next use. For example, to "**Save as**" a word document, the following steps are needed.

1. Click the office **File** tab.
2. Click the **Save As** option.
3. Give it a file name, then click **Save**.

Type some sentences or a paragraph on word processor and go to the **File** tab.

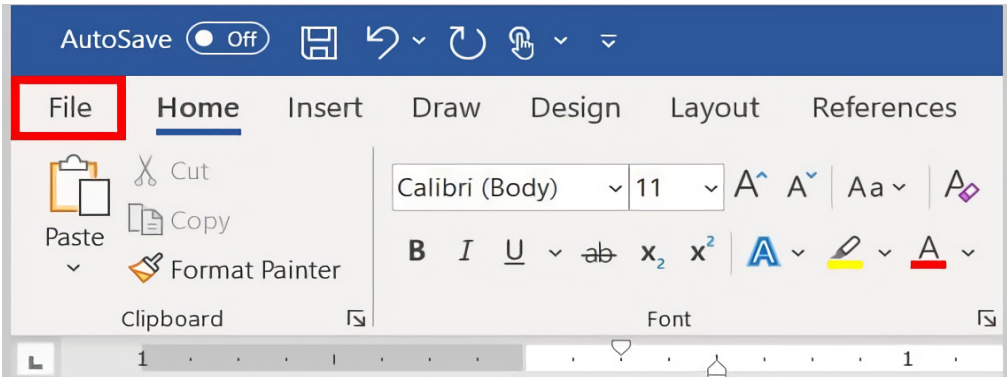


Figure 3.3. File tab

From the File tab, click on "**Save** or **Save as**" as shown in Figure 3.4 below.

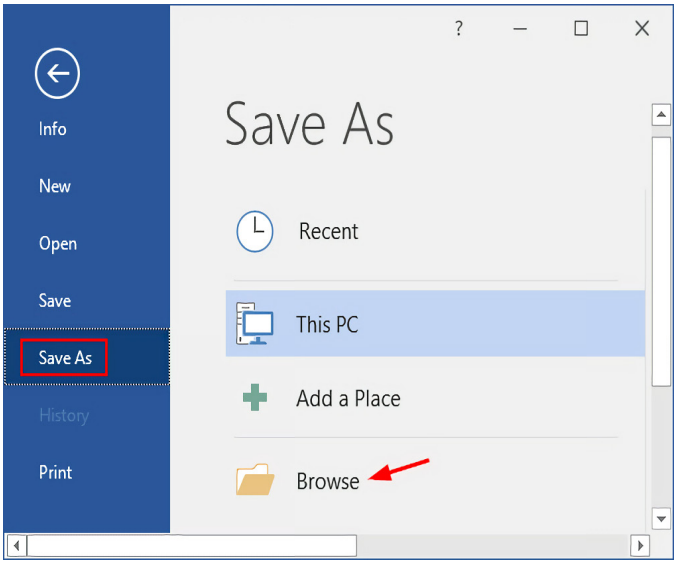


Figure 3.4. Selecting Save As to Save a file

After you clicked on **Save as** tab, you will select where to **save** file. For example, here we select documents directory to save it, as it shown in Figure 3.5.

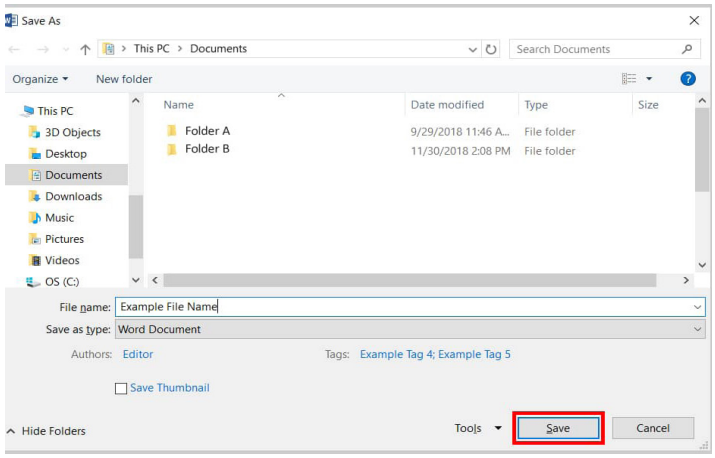


Figure 3.5 Saving a document

Finally, you have to provide file name and click on save tab, as it shown in the Figure 3.5 above.

III. Insert Text

The basic steps to insert text in word processor are listed below.

1. **Click** the word processor icon to open it.
2. You will see a **Blinking cursor** or **Insertion point** in the text area below the ribbon.
3. Now, as you start **typing**, the words will appear on the **Screen** in the text area.
4. To change the location of insertion point, press spacebar, **Enter** or **Tab keys**. See Figure 3.6 below as an example.

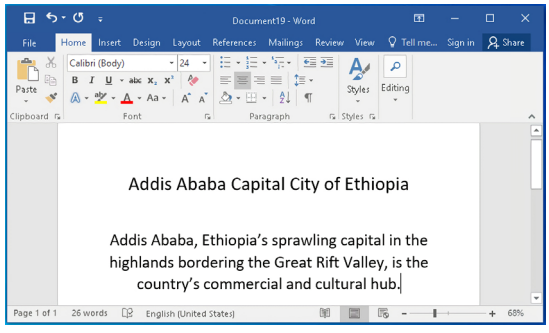


Figure 3.6. Inserting a text

IV. Copy and Paste

Word processor offers different methods to copy and paste a text. Some of the methods are given below: For example,

1. **Select** the text you want to **Copy**.
2. Select the **Home** tab and click **Copy.**See Figure 3.7 below.

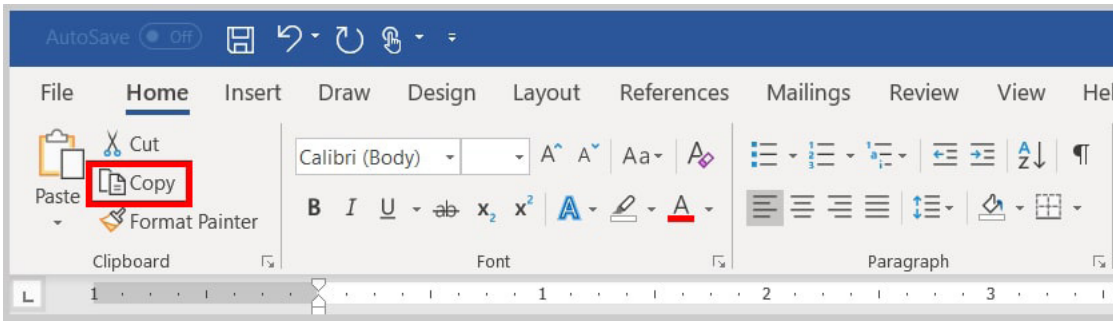


Figure 3.7. Copy from Home tab

3. Place the **Cursor** where you want to **Paste** the text and
4. Click the **Paste** in **Home** tab. See Figure 3.8 below.

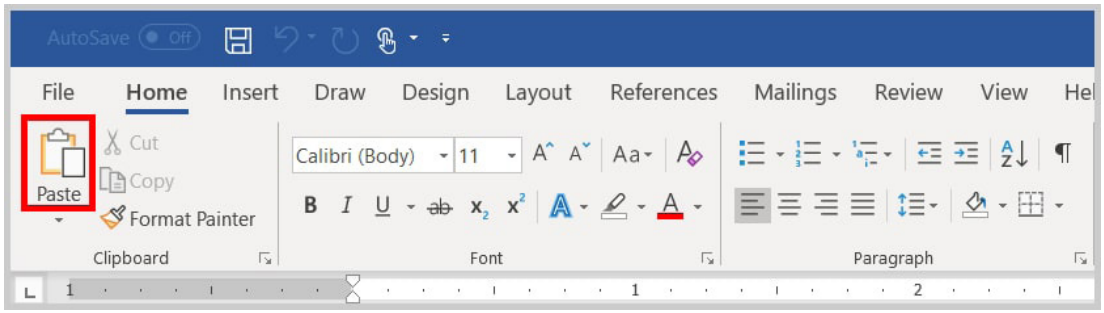


Figure 3.8 Paste from Home tab

Alternatively, the following steps are important to copy and paste. For example,

1. **Select** the text.
2. Place the **Cursor** over the text and **Right click** the mouse.
3. A menu will appear; with a left click select the **Copy** option.

4. Now, move the **Cursor** to a desired location and **Right click** the mouse.

5. A menu will appear; with a left click select the **Paste** option. See Figure 3.9 below.

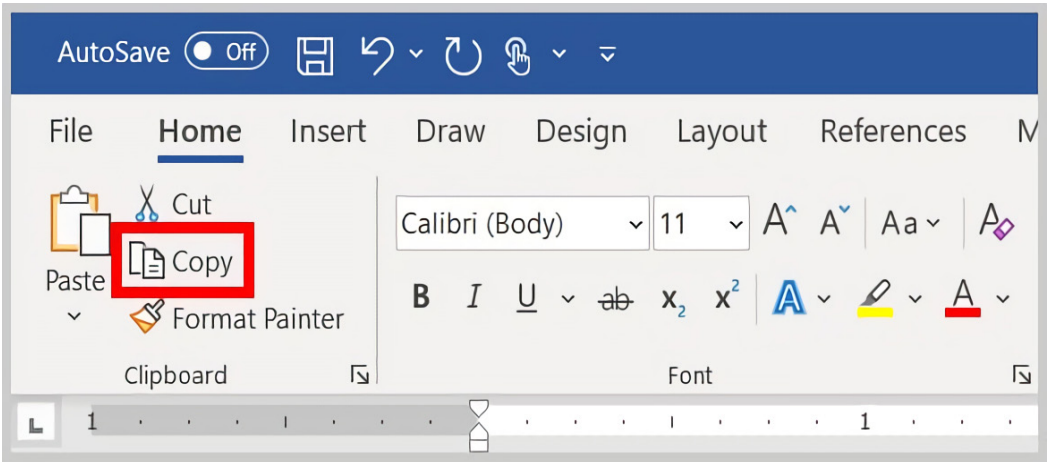


Figure 3.9. Copy from Home

After you have selected the text, **Right click** and click on **Copy**, as it is shown Figure 3.9 above. Alternatively, go to the **Home** tab and click on the **Copy** and then click on **Paste**.

V. Cut and Paste

Word processor allow us to cut and paste the same portion of a text throughout the document as long as the text remains on the clipboard. For example, to cut and paste a text, the following steps are important.

1. **Select** the text.
2. **Right click** and choose **Cut** option.
3. On the clipboard, group on the **Home** tab, click the **Cut** option or
4. Place the **insertion point** where you want the text to be inserted.
5. On the clipboard, group on the **Home** tab and click the **Paste**.
6. Right click and choose **Paste**.

Type a paragraph about Addis Ababa and **Copy**, and **Paste** paragraph as shown in the Figure 3.10 below.

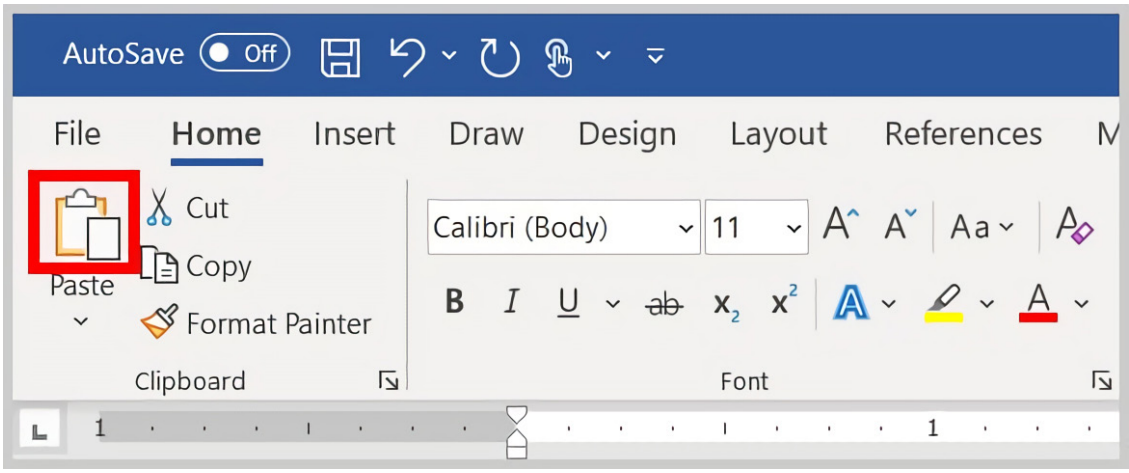
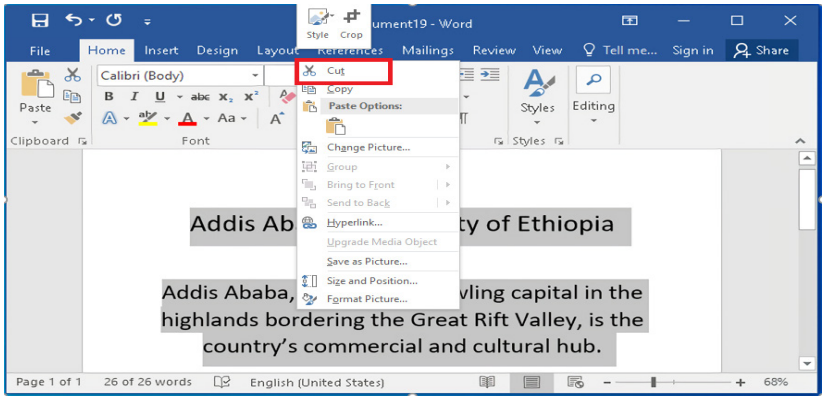


Figure 3.10. Paste from Home Button

Right click on the paragraph and select **Cut** option, as it shown in the above Figure 3.10. As an alternative, you can also select **Home** tab and choose **Cut** and then **Paste,** as shown in the Figure 3.11.



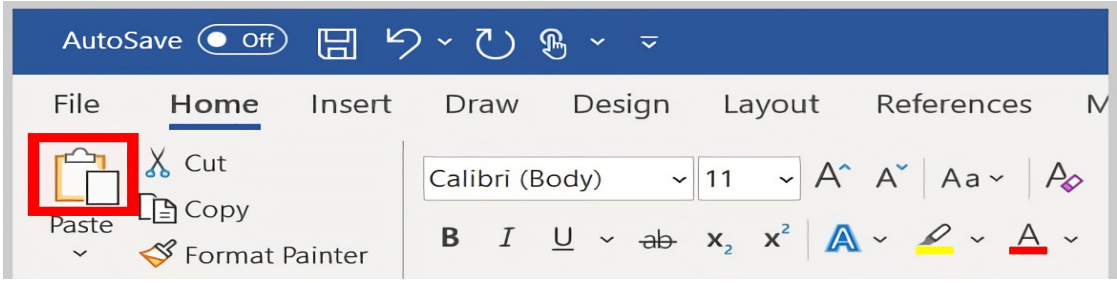


Figure 3.11. Cut a text and Paste from Home

VI. Formatting

Bold: is a set of characters that are darker and heavier than normal. A bold font implies that each character is originally designed with a heavier appearance other than created on the fly from a normal character. For example, **Bold** (See the Figure 3.12 below).

Italic: is style of font that slopes the letters evenly to the right. For example, this word is *italicized* (See the Figure 3.12 below).

Underline: is a section of text in a document where the words have a line running extend them for example underline (See the Figure 3.12 below).

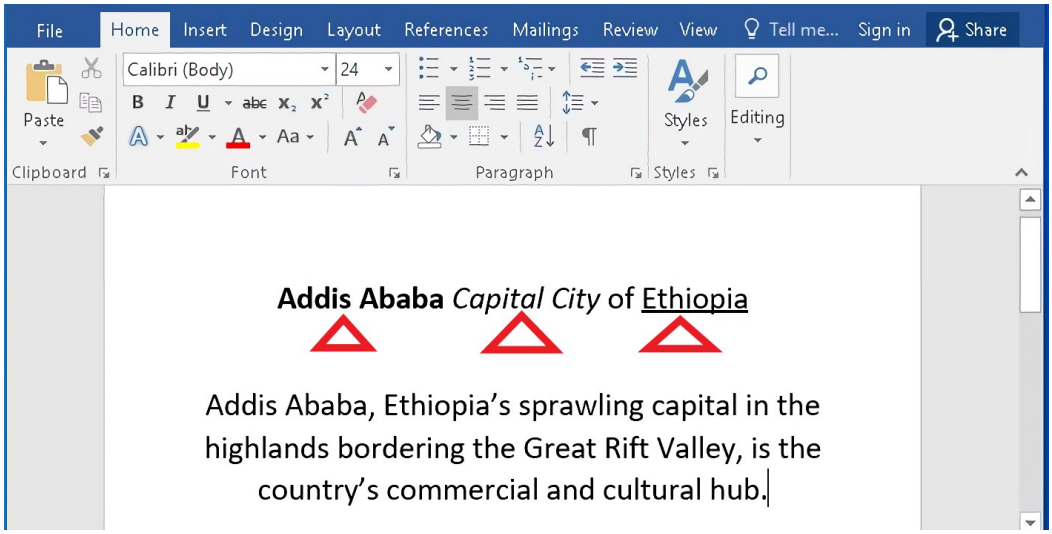


Figure 3.12 Bold, Italic and Underline types

Font Type and Size: There are various default font type and font size in word processor, as it shown in the Figure 3.13 font type and Figure 3.14 font size.

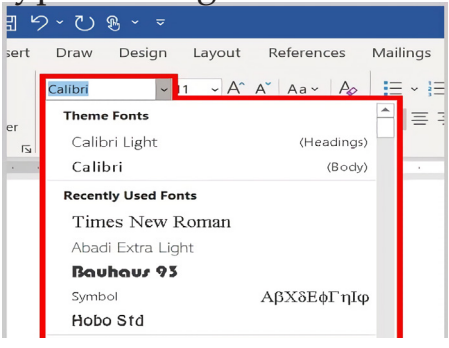


Figure 3.13. Font type

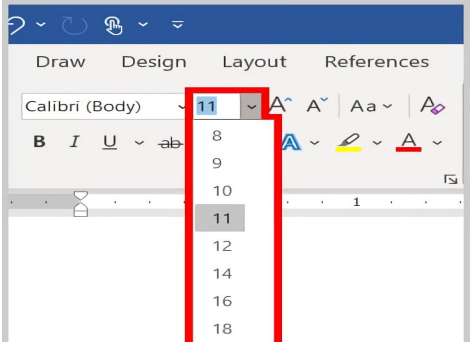


Figure.3.14. Increasing and decreasing font size

To increase and decrease the font size of your text, you can select the number of size, as it shown in the Figure 3.14 above.

Text Color: is used to emphasize a particular text and allow you to change the font color of your text. To change the font color of your text you can select a color from color options. For example, the red color is selected, as it shown in Figure 3.15 below.

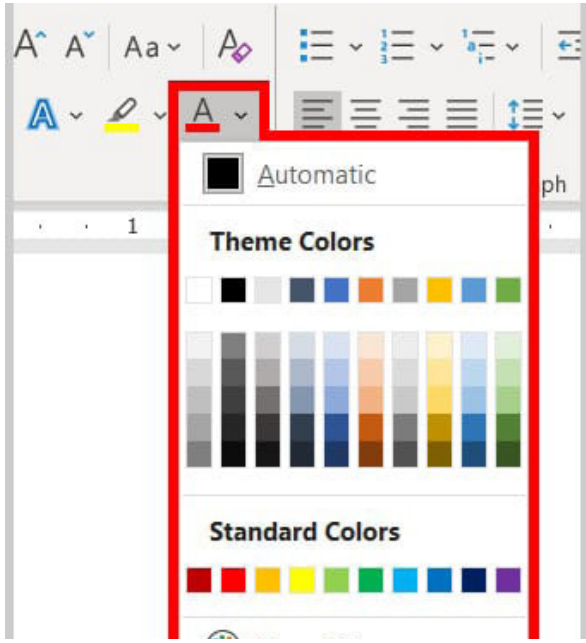


Figure 3.15: Font color options

Activity 3.3

- Write a paragraph about the history of Ethiopian airlines using word processor and it show to your teacher.

3.6. Spreadsheet

Brainstorming activity

- Do you know how to perform subtraction, addition, multiplication and division using

Spreadsheet is an application used to organize and calculate data in cells. It is a data file made up of rows and columns. It is used to sort data and allow a user to manipulate and arrange data easily. It is used to calculate values using mathematical formulas in the cells. See the opened new spreadsheet in Figure 3.16 below.

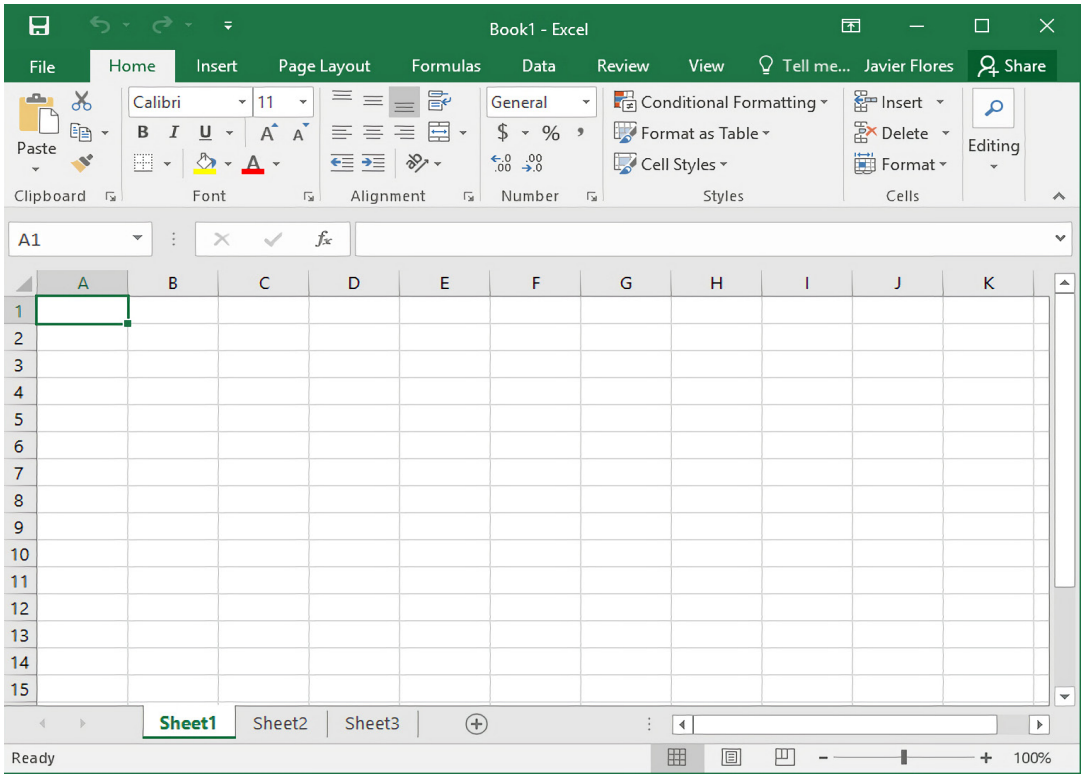


Figure 3.16: Opened New Spreadsheet

Once spreadsheet is opened the important buttons, rows, columns, and headers appear. See the Figure 3.17 below.

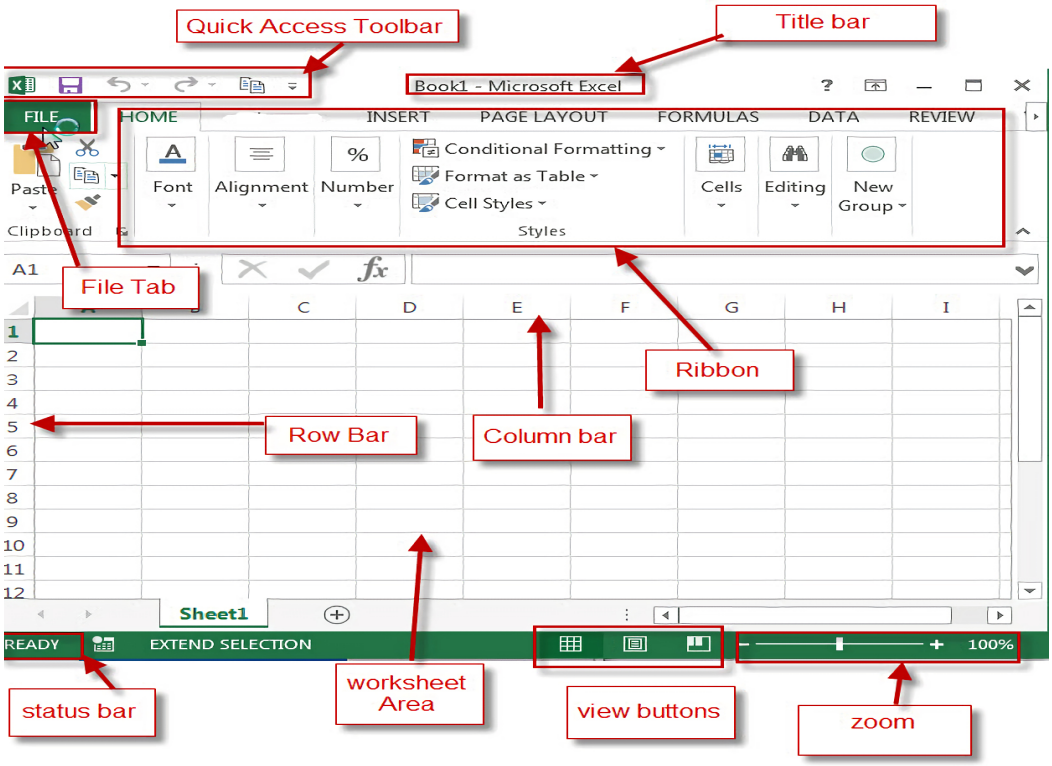


Figure 3.17. Elements of spreadsheet

Spreadsheet helps to create tables in rows and columns. The tables allow you to analyze your data in spreadsheet quickly and easily. See the Figure 3.18 below.

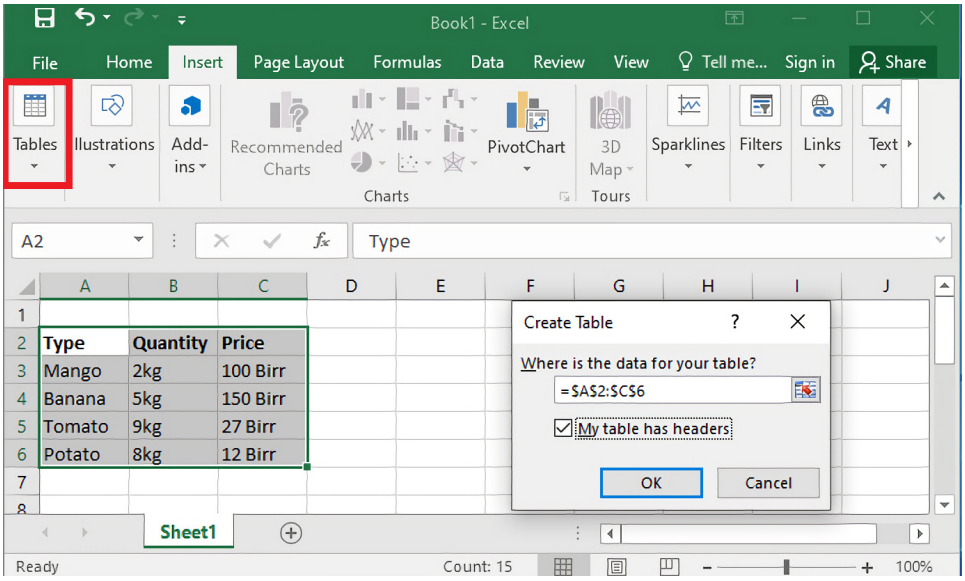


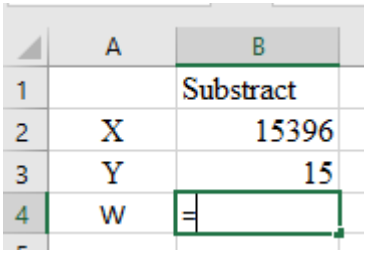
Figure 3.18: Creating table in spreadsheet

There are two basic ways to perform calculations in formulas and functions using spreedsheet.

I. Formulas

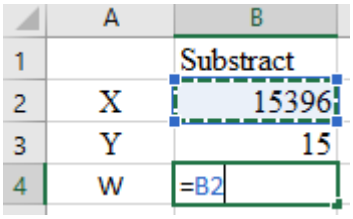
In spreadsheet, a formula is an expression that operates on values in a range of cells or a cell. For example, =B2+B3, which finds the sum of the range of values from cell B2 to cell B3.
To create a formula that refers to values in other cells,

1. Select a cell;
2. Type the equal sign (=) in the cell B4.

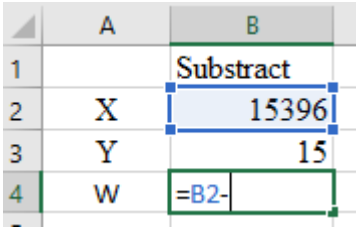


Note: Formulas in spreadsheet always begin with the equal (=) sign.

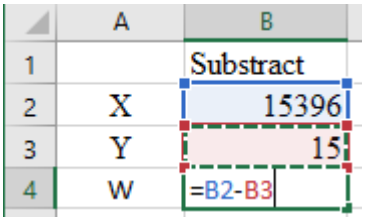
3. Select a cell or type its address in the selected cell.



4. Enter minus operator into cell B4.



5. Select the next cell B3,
or type its address in the selected cell.



6. Press Enter. The result of the calculation appears in the cell with the formula.

	A	B
1		Substract
2	X	15396
3	Y	15
4	W	15381

II. Functions

Functions are predefined formulas in spreadsheet. Functions can be used to perform calculations. The structure of a function begins with an equal sign (=), followed by the function name, an opening parenthesis, the arguments for the function separated by commas, and a closing parenthesis. Some of the functions in spreadsheet are sum, average, maximum and minimum. For example in the Figure 3.19 the function is: =SUM(C3:C6).

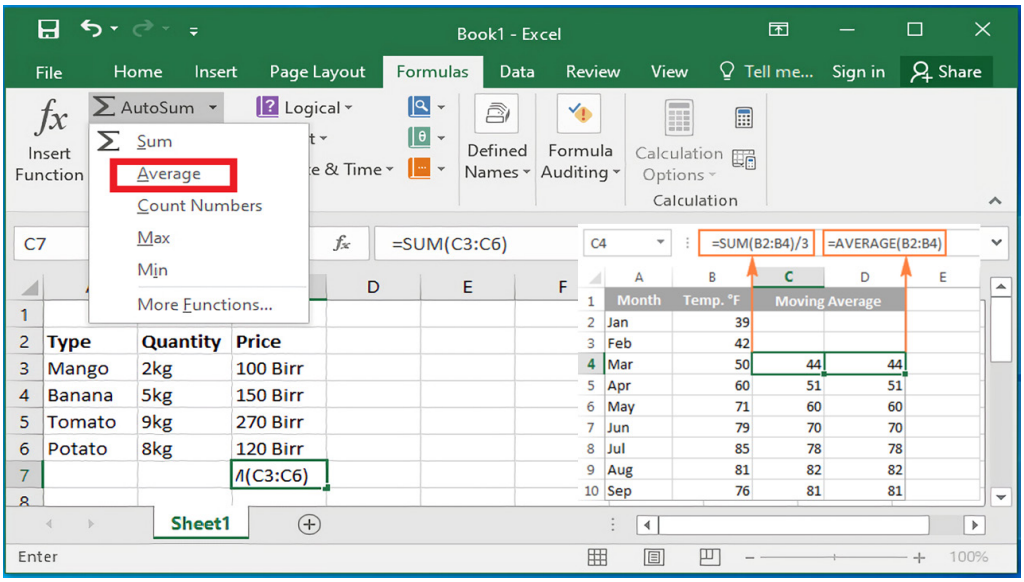


Figure 3.19 Functions in Spreadsheet

Activity 3.4

- Create a file and enter your information such as your name, age, gender, grade, test one and test two. Find the sum of your test by using a spreadsheet.

3.7. Power Point

Brainstorming activity

- Do you know how to prepare a power point presentation?

A power point helps to create a slideshow that addresses a topic or presentation. Sometimes power point is known as a presentation or slide. It typically includes three major functions:

- an editor that allows text to be inserted and formatted.
- a method for inserting and manipulating graphic images.
- a slide-show system to display the content.

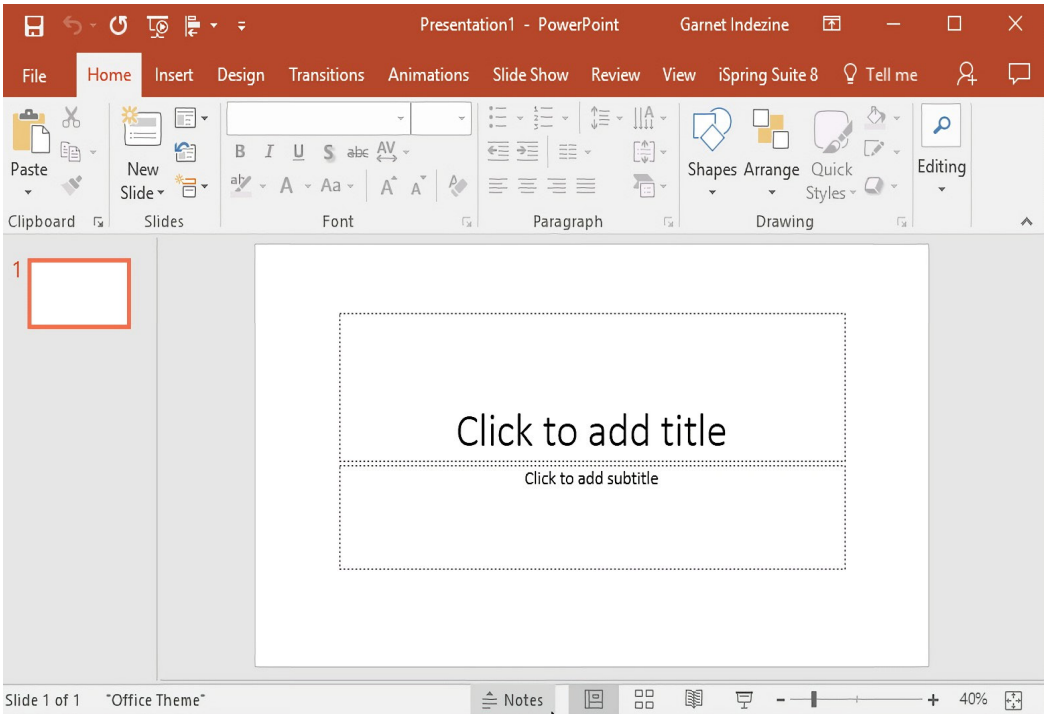


Figure 3.20 Power Point

I. Insert Slide

The presentation contain one slide with the title 'Slide layout'. It helps to insert as many slides as needed from a variety of layouts, as shown in Figure 3.21 below.

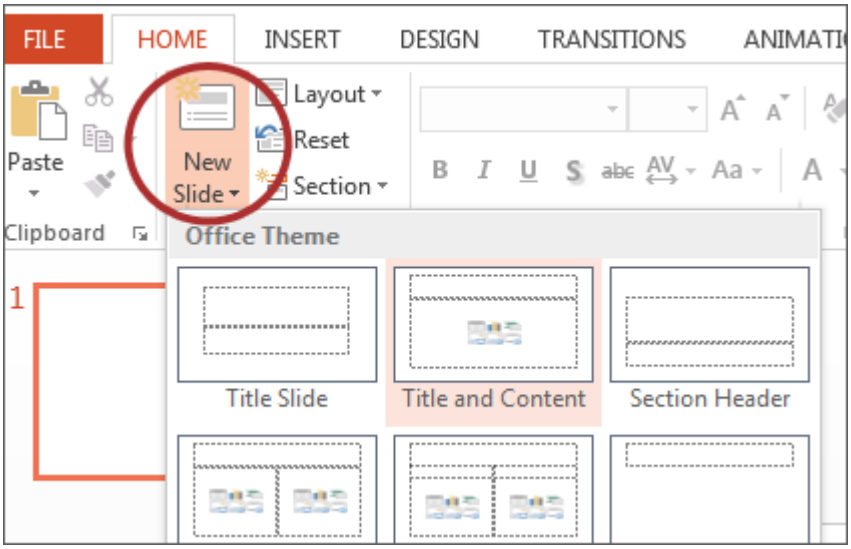


Figure 3.21. Inserting a new Slide

II. Copy and Paste

Click on the slide and select **Copy** from **Home** tab, as shown in Figure 3.22 below.

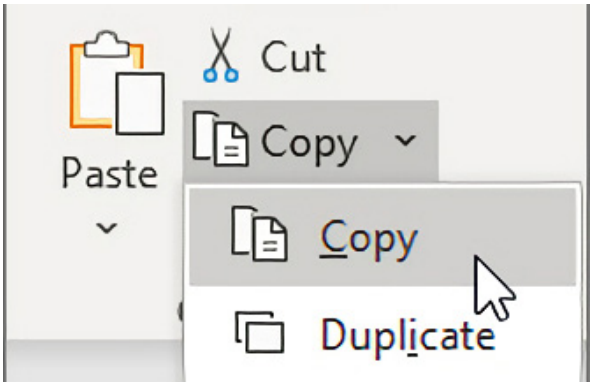


Figure 3.22. Copying Slide

Then **Right** click and select **Paste** option, see Figure 3.23 below.

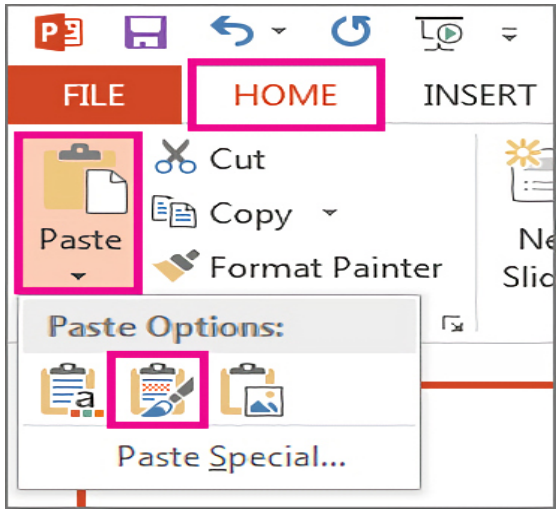


Figure 3.23 Paste

III.Cut and Paste Slides

For example to cut and paste the slides, the following steps are important:

1. **Select** the slide you want to **cut.**
2. **Right** click on the slide.
3. Then click on **Cut** option.

Right click on the slide and choose the **Cut** option, as shown in Figure 3.24 below.

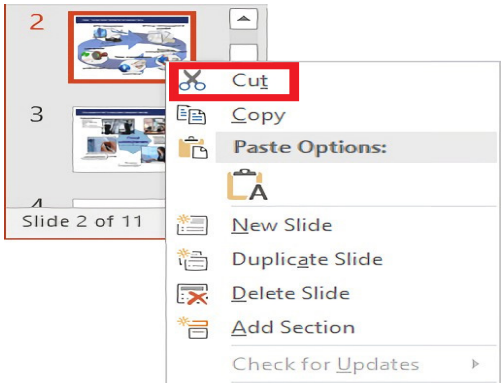


Figure 3.24. Cuting Slide

Then click on **Paste** option to paste your slides, as shown in Figure 3.23 above.

V. Delete the Slides

Right click on the slide and choose **delete** option, as depicted in Figure 3.25 below.

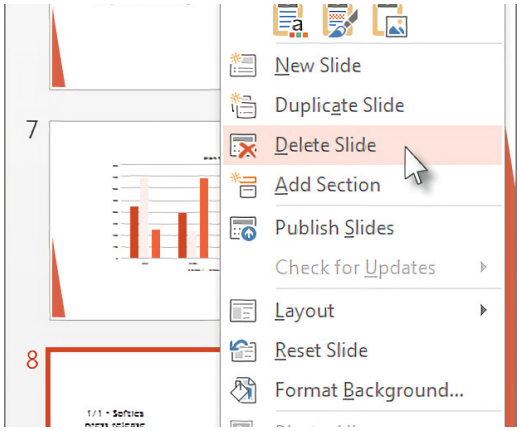


Figure 3.25: Delete Slides

Activity 3.5

Write a tale you know in your village and present to your class using a power point.

Instructions:

1. Italicize, bold and underline the topic of your tale.
2. Insert page number to your slide.
3. Use any colour you want, example, blue color.
4. Save it by your name.

Summary

In this unit, you have learnt about operating system, utility, driver software, word processor, spreadsheet and power point presentation. The following are summary of this unit.

- An operating system is system software that manages computer hardware and software resources, which pro vide common services for computer programs.
- Utility software manages matters associated with the analysis, configuration, performance, and maintenance of a computer system.
- Utility software are system utilities, storage device, man agement utilities, file management utilities, and miscella neous utilities.
- Driver software is a type of software program that con trols hardware devices.
- Application software is the general designation of computer programs for performing tasks.
- Application software includes word processing, spreadsheet and PowerPoint presentation.
- Word processor is a software program capable of creat ing, storing, and printing documents.
- Spreadsheet is a data file made up of rows and columns that are used to sort data and allow a user to manipulate and arrange data easily, commonly numerical data.
- A power point presentation is software that helps to cre ate a slideshow that addresses a topic or presentation.

Review Questions

Part I: Say "True" if the statement is correct and "False" if it is incorrect.

1. Application software used to perform calculation is called power point.
2. Utility software allows the peripheral devices to communicate with the operating system.
3. Anti-virus is a software used to store and configure data on the computer.
4. A software that helps to create presentation on a topic is spreadsheet.
5. Operating system is a system software that manages both hardware and software.

Part II: Choose the correct answer for each of the following questions.

1. What would be the a correct formula for sum in spreadsheet?

   A. =SUM(B3:B9)
   C. SUM(B3:B9)
   B. =SUMB3+B9
   D. =ADD(B3:B9)

2. Which area on the File tab has the command allowing a word document to preserve a file?

   A. Info
   C. Save As
   B. Share
   D. Options

3. The application software that is used to prepare a presentation is _____.

   A. Spreadsheet
   C. Browser
   B. Word Processor
   D. Power Point

4. Which one is not utility software?

   A. System Utility
   C. Miscellaneous Utilities
   B. Management Utilities
   D. None

5. _____ is system software that manages computer hardware and software.

   A. Utility Software
   B. Driver Software
   C. Operating System
   D. Anti-virus

Part III: Demonstrate the following questions.

1. From the following table, demonstrate the sum and average of the student result using spreadsheet.

Student Name	Mathematics	Chemistry	Biology	Physics	English	Sum	Average
Lattuu Walabuma	89	85	93	82	75		
Kebede W/Mariam	75	87	90	73	82		
Zabarga Hussen	65	89	87	75	89		
Fatuma Jemal	89	78	65	78	79		
Hagos Getachew	79	89	74	89	76		
Ujulu Osman	67	87	75	75	89		
Ayde Ergando	81	74	87	87	78		
Obsineet Workineh	87	78	88	94	98		

2. Prepare a short power point presentation about your biography.

UNIT 4 Internet

Unit Outcomes

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

- *describe internet services;*
- *explain the difference between internet and WWW;*
- *explain file transfer and text transmission protocol;*
- *browse information on the internet;*
- *explain uses of the email and social network;*
- *create email address and ex change mail,*
- *create Facebook and telegram account and*
- *benefits and risks of social networks*

Overview

Dear students, in grade 7 you have learned the definitions of the internet, WWW, web page, website, browser, search engine, web server, and web addresses. In this unit, you will learn about internet services, WWW, file transfer, text transmission protocol, browsing information on the internet, email and facebook and benefits and risks of social networks.

Brainstorming activity

- Discuss the major uses of the Internet that play a vital role in daily life.

4.1. Internet Services

Computer network is when two or more computer systems are connected together. Internet refers to network of networks. Internet is a world-wide global system of interconnected computer networks. The internet is the largest computer network in the world connecting millions of computers. World Wide Web (WWW), E-mail, Telnet and file transfer protocol (FTP) are some of the internet services that facilitate access to internet resources.

4.1.1. World Wide Web

World Wide Web (WWW) is a collection of websites or web pages. It is known as a Web. The World Wide Web or Web is a part of the internet. The Web was invented in 1991 by Tim Berners-Lee. It is connected to local computers through the internet. Users can access the content of sites from any part of the world over the internet using the devices such as computers, laptops, and cell phones. The WWW is viewed through web browsers such as Google Chrome, Internet Explorer and Mozilla Firefox. By using the browsers, one can access a web page from the internet.

Web page

webpage is a document available on WWW. Web pages are stored on a web server and can be viewed using a web browser. A web page can contain large information including text, graphics, audio, video and hyperlinks. Hyperlinks are the link to other web pages. A collection of linked web pages is known as a **website.** Each web page has its unique Uniform Resource Locator **(URL).** A URL is an address to a web page on the internet. A URL has two main components. they are protocol identifier and resource name. For example URL: http://www.google.com/. For this URL, the protocol identifier is hypertext transfer protocol ***http*** and the resource name is **www.google.com**. Web pages are categorized into static web pages and dynamic web pages based on the information they contain.

Static web page

Static web pages contain only static information i.e. user can only read the information but cannot do any modification or interact with the information. Static web pages are only used when the information is no more required to be modified. A static web page remains the same until it is updated.

Dynamic Web page

A dynamic web page or dynamic website contains information that changes depending on the viewer, the time of the day, the time zone and the viewer's native language. A dynamic web page automatically changes daily to give visitors a new content.

4.1.2. File Transfer Protocol (FTP)

FTP is one of the internet services that are used for transferring files from one system to another using internet. FTP is a way to download, upload and transfer files from one location to another on the internet and between computers. FTP is also used to transfer files when the file size is large or when several files are transferred which are difficult to transfer using email.

4.1.3. Hypertext Transfer Protocol

HTTP stands for *hypertext transfer protocol.* It is used to access data on the World Wide Web. HTTP has a server (service) and client (request) communication protocol. HTTP is also used for formatting and transferring web page data (text, images and video) over the World Wide Web. It is used to create communication between Web servers and Web users. It acts as a request-response protocol. For example, a client who uses a web browser and a server is a Web host that hosts the website. Whenever a client transmits a request to the Website server, the HTTP proceeds that request and creates a connection between the client and the server through Transmission Control Protocol (TCP). Then HTTP sends a request to the server, which picks up the requested data from database, and HTTP sends the response back to the client. HTTP functions as a combination of FTP and Simple Mail Transfer

Protocol (SMTP). The HTTP protocol is like SMTP protocol because the data transferred between the client and the server look like SMTP messages. However, HTTP differs from SMTP on how the clients' messages are sent to the server and from the server to the client. Unlike SMTP, the HTTP messages are not read by humans; they are read and interpreted by the HTTP server and HTTP client (browser). SMTP messages are stored and forwarded, but HTTP messages are delivered immediately. There are others protocols such as Internet Message Access Protocol (IMAP) and Network Time Protocol (NTP).

4.2. Browsing information

Brainstorming activity

- In groups, discuss what we can search on the internet.

Browsing information is searching or finding information on the internet. Internet searching is one of the easiest and useful ways to get useful information on the internet by using different search engines. **Search engines** make this information easier to find. People use common search engines such as Google and Yahoo to find images, books, currency conversions, definitions of words, news and movies. The most popular search engine these days is **Google**.

To search information on the internet, first open a search engine using a web browser. After you have opened the search engine, type one or more **keywords** also known as **search terms;** then press **Enter** on your keyboard. For example, we can search for **what is computer?'.** See figure 4.1.

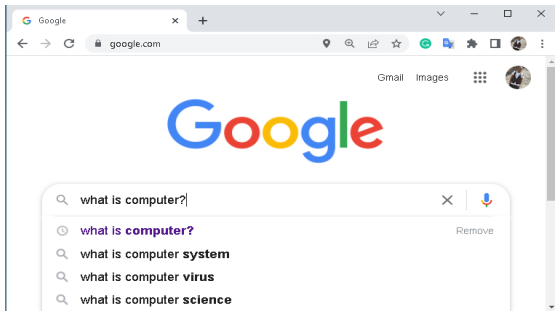


Figure 4.1: How to type keyword on Google search engine

Then, a list of **relevant websites** that match what you searched will be displayed. These are commonly known as **search results.** If you see a site that looks interesting, you can click a link to open it. If the site does not have what you need, you can return to the results page to look for more options. Figure 4.2 shows how we search for information from the internet.

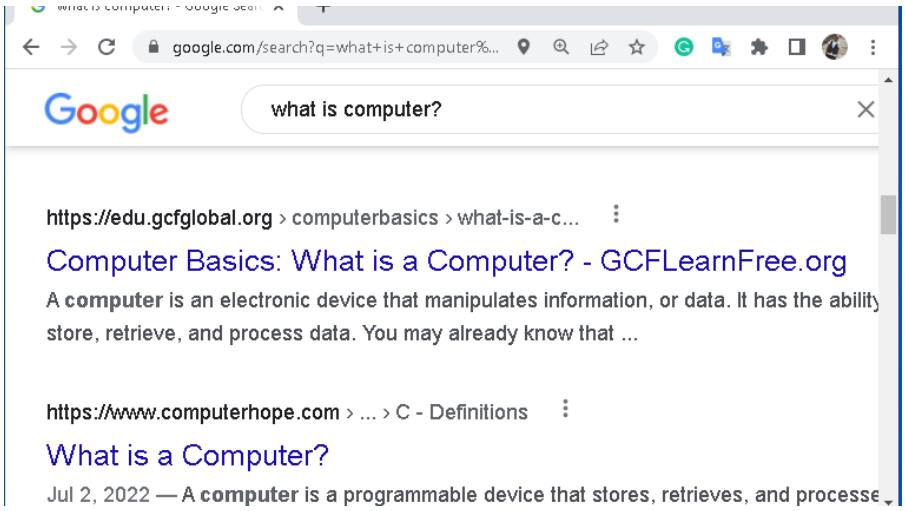


Figure 4.2: Searching information from the internet

Activity 4.1

- Browse the information from the internet such as Abay River and famous athletes in Ethiopia.

4.3. Electronic Mail (Email)

Brainstorming activity

- Have you ever used email? If so, for what purpose did you use it?

Email is a way to send and receive messages using the internet. It offers an efficient, inexpensive and real time means of distributing information among people. There are many different email services available that allow you to create an email account, send and receive

email and attach files for free. Figure 4.3 below shows the different email services.

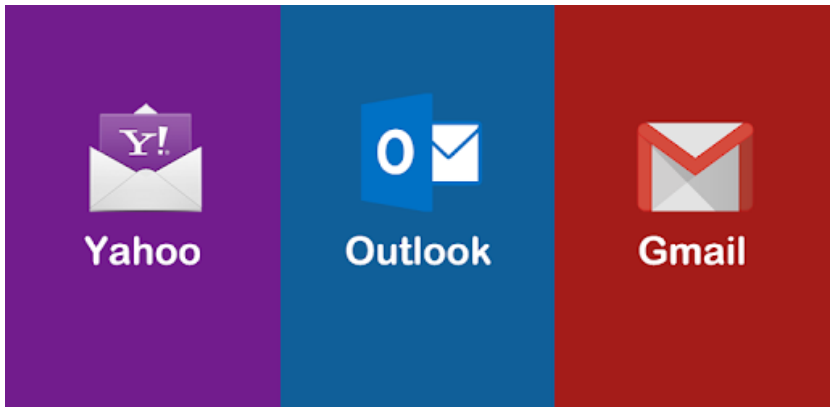


Figure 4.3: Yahoo, Outlook and Gmail icon

I.Creating Email

Google mail (Gmail) is one of the most used email services around the world. If you want to create a Gmail account, you need to provide some basic information like your name, birth date, gender, and location. Even you have to choose a name for your new Gmail address. Follow the steps below to create Gmail account with the quick sign-up process.

Step 1: Visit Google account creation page, *https://accounts.google.com*

Step 2: Click on **Create account.**

Step 3: The sign-up form will appear. Enter your **first** and **last name**.

Step 4: Choose a **Username** for your account.

Step 5: After choosing a username, **enter a password**. Type the password again to confirm. As per the Google's instruction, always use 8 or more characters with a mix of letters, numbers and symbols.

Step 6: At last click on **Next,** Right corner of the screen.

Step 7: On the next page, enter **your phone number** to verify your account. It is a two-step verification process for security.

Step 8: On the given mobile number, you will receive a text

message from **Google** with a verification code. **Enter** the **verification code** and tap on **Verify**.

Step 9: On the next page, enter your **date of birth** in the specified fields.

Step 10: Choose **gender**.

Step 11: Click on the **Next button**.

Step 12: Read, Google's terms of service and privacy policy will appear on the screen. Click on the "**I agree button"**.

II. Common Email Features

Email Address

Each user of email is given a unique name for his/her email account. This name is known as E-mail address. Different users can send and receive messages based on their e-mail address. To receive emails, you will need an **email account** and an **email address**. To send emails to other people, you will need to get their email addresses. It is important to learn how to write email addresses correctly because if you do not enter it exactly, your emails will not be delivered or might be delivered to a wrong person.

Email addresses are always written in a standard format that includes a **user name**, **@** (at) symbol, and the **email provider's domain**. The **email provider** is the website that hosts your email account. The **user name** is the name you choose to identify yourself. E-mail is generally of the form username@domainname.

For example, abdisa.aga**@gmail.com** is an e-mail address where **abdisa.aga** is a username and **gmail.com** is the domain name. The username and the domain name are separated by **@ (at)** symbol. E-mail addresses are not case sensitive. Spaces are not allowed in e-mail address.

Inbox

In inbox, we view and manage emails sent from another person or people. Emails are listed by the name of the sender, the subject of the message, and the date received.

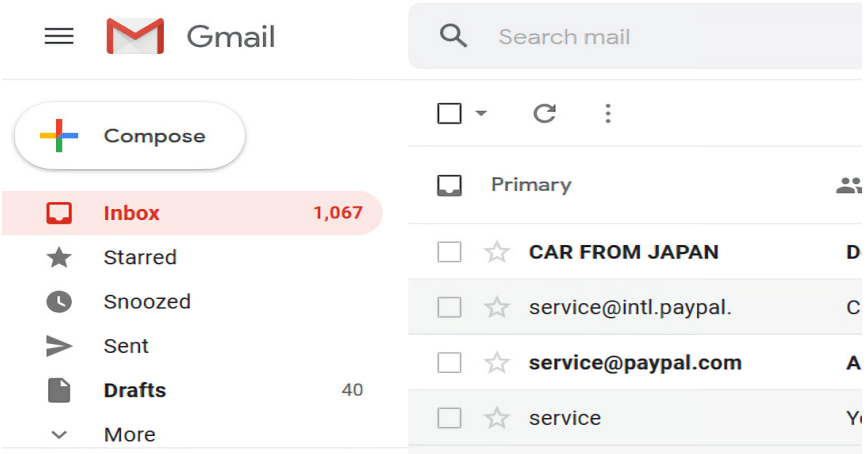


Figure 4.4: Inbox

Message pane

When you select an email in the inbox, it will open in the **message pane**. From here, you can **read the message** and choose **how to respond** with different types of commands as indicated in figure 4.5 below.

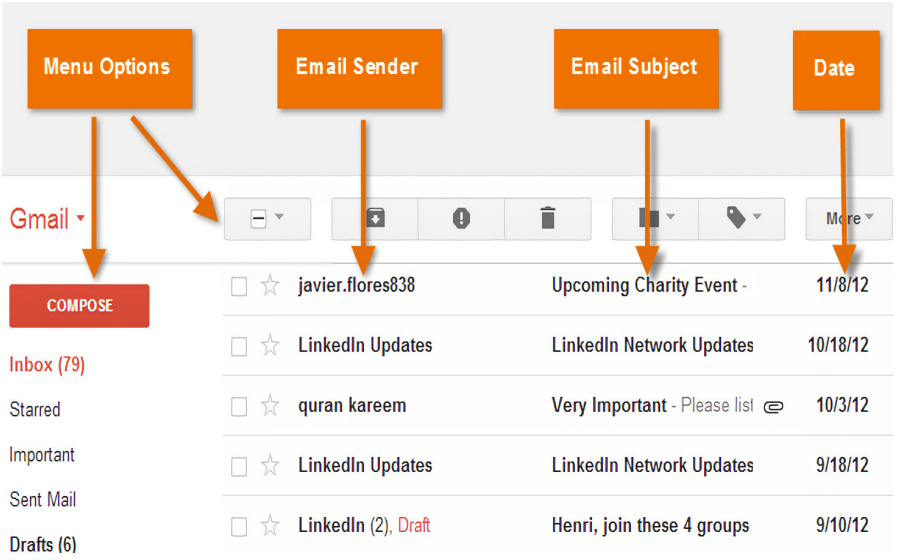


Figure 4.5: Message pane of Gmail

Compose pane

After you have clicked on the compose button, the recipient's **email address** and **subject are needed to be filled**. Then, write your email message. There is also an option to upload files like photos and documents as **attachments.**

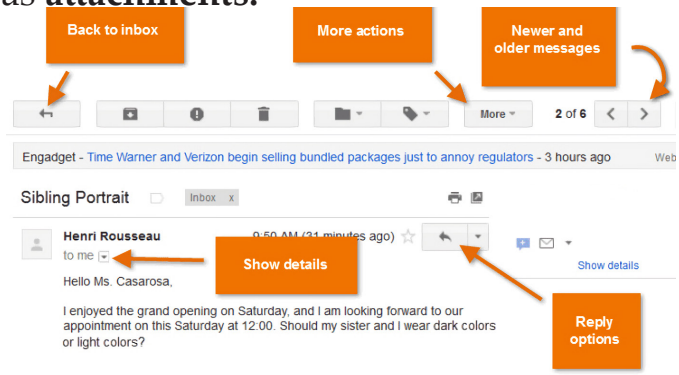


Figure 4.6: Compose pane of Gmail

Forward

Whenever you want to share an email you have received from another person, you can use the Forward button to send the message to another person.

Activity 4.2

Using your email account, do the following activities:

1. Send a message to your classmate.
2. Read new messages in your "Inbox".
3. Forward an email to your classmate.

4.4. Social networks

Social networks refers to the means of interactions among people in which they create, share, and/or exchange information and ideas in virtual communities and networks. Social networking is the use of internet-based social network sites to stay connected with friends, family, colleagues, customers, or clients. Social networking can have a social purpose, a business purpose and educational purpose through sites like Facebook, Telegram, Skype, YouTube, Instagram, LinkedIn and Twitter. Unless a social network is used properly, it has several risks as indicated in section 4.5. Therefore, you are advised to use social networks properly. See the different social networks plat forms in figure 4.7 below.

Figure 4.7: Social network platforms

Facebook

Facebook is a popular social network website that allows users to create profiles, upload photos and videos, send messages and stay connected with friends, family and colleagues.

How to create a Facebook account

1. Go to **facebook.com** and click **Create New Account**.
2. Enter your name, email or mobile phone number, password, date of birth and gender.
3. Then click **Sign Up**.
4. To finish creating your account, you need to **confirm your email or mobile phone number**.
5. Then, go to **facebook.com** and enter your email or phone number and password.
6. Finally, click the Log in pane.

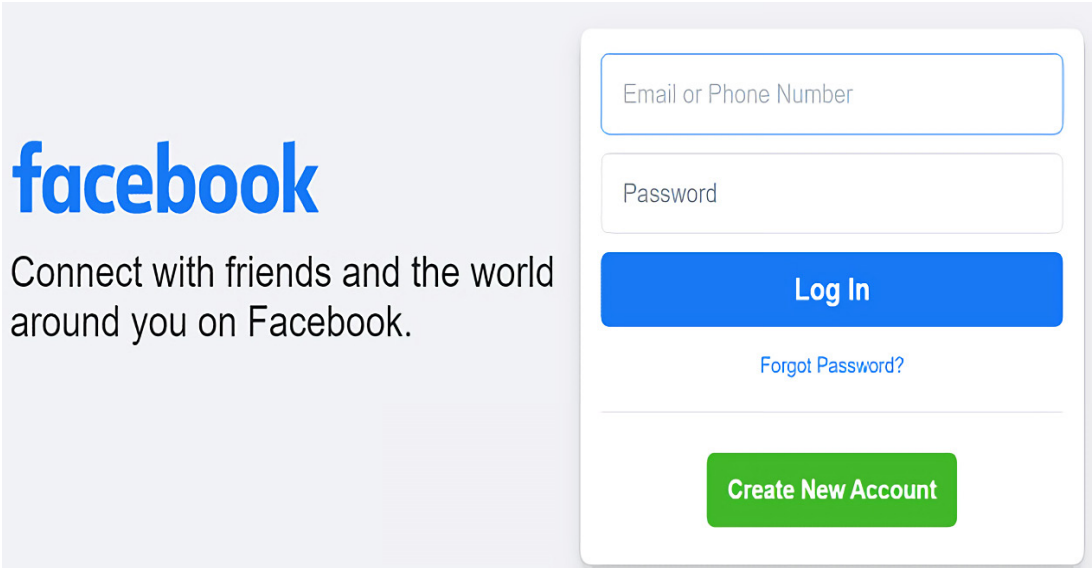


Figure 4.8: Facebook account

Telegram

The telegram is an online messaging application. Telegram is used to send messages to your contacts when connected to Wi-Fi or mobile internet. It is also used to transmit texts, photos, videos, audio files, location information, contacts and documents. The telegram has the ability to show whether your communication partner is online or not.

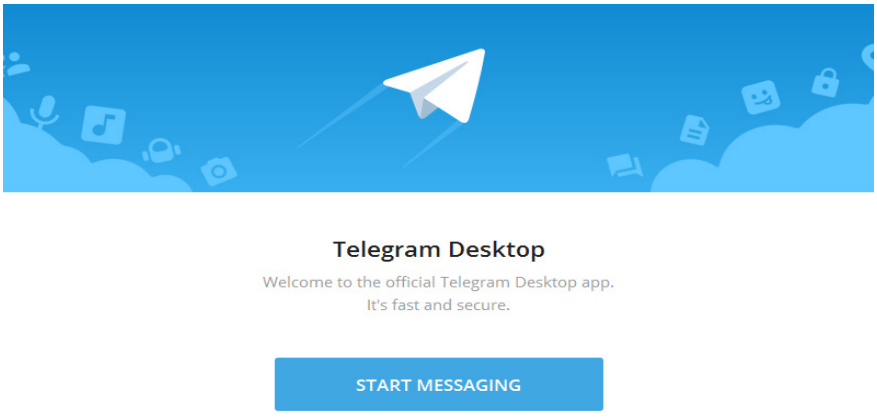


Figure 4.9 Telegram

To create a Telegram account,

1. Install the Telegram application.
2. Enter your phone number.
3. Add your user name and a picture.
4. Find a friend with Telegram.
5. Start chatting.
6. Send a photo, video, document, contact or your current location.

LinkedIn

LinkedIn is another online service that provides business and employment-services which operates through various online sites. LinkedIn is mainly used for professional networking. Figure 4.10 below shows the way LinkedIn is used.

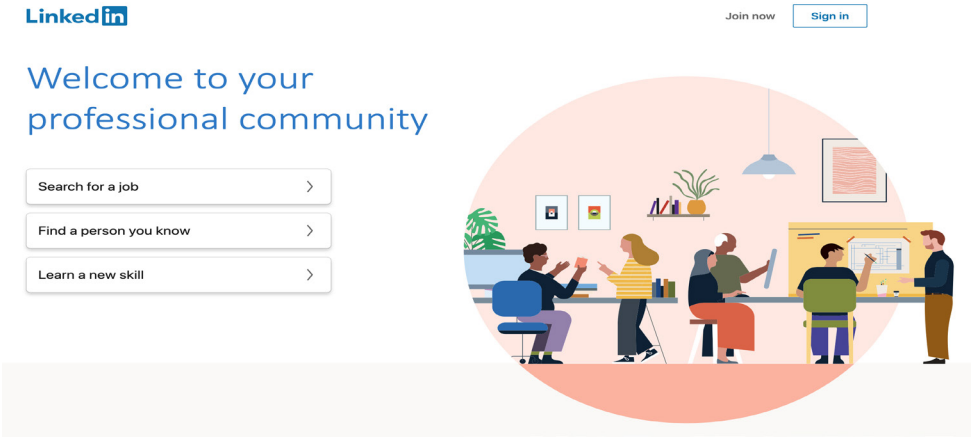


Figure 4.10: LinkedIn Sign in

YouTube

YouTube is a video sharing website on which users can upload, view, and share videos which are informative and inspirational to others. See figure 4.11.

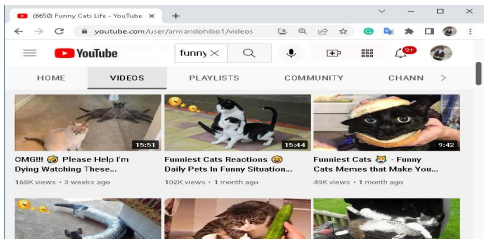


Figure 4.11: YouTube

Twitter

Twitter is one of the micro-blogging services. *Microblogging* is a web *service* that allows the subscriber to broadcast short messages to other subscribers of the *service*. *Twitter* permits people to be able to post and exchange text messages limited to 140 characters either through computers or mobile devices. The major function of twitter is to post and get connected to the latest information that interests users and follow within the conversations they are interesting in. Figure 4.12 below shows the twitter sun up.

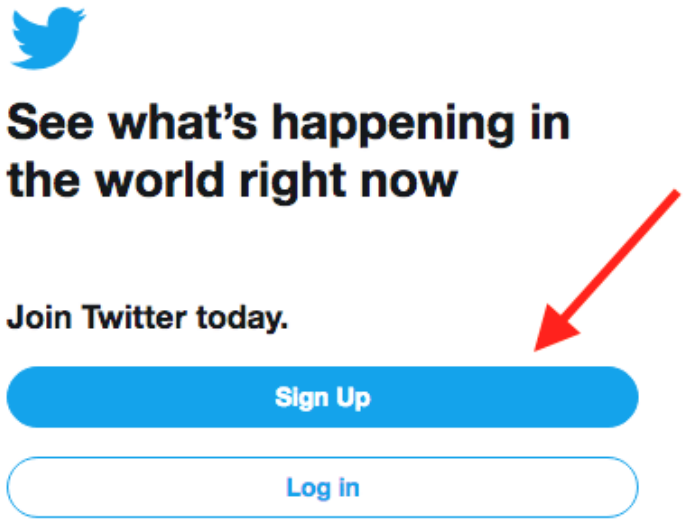


Figure 4.12: Twitter Sign Up

4.5. Benefits and Risks of Social networks

Brainstorming activity

- Do you believe that there are any risks associated with utilizing social network? What are some of the risks of utilizing social media?

Using internet has benefits and risks. Benefits are advantages gained from the internet when used properly while risks are disadvantages caused when internet is not used properly.
Users of internet have grown up significant number with the internet and digital devices as part of their everyday life. They can use social networks to connect with others including friends, family and teachers.

1. Benefits of Social Networks

The internet, for children and adults alike, is a hugely important medium. Children and young people now frequently use the internet to:

- search information;
- communicate; express ideas, share information and experiences;
- interact socially with friends and family;
- innovate, create and share content;
- play and be entertained such as games, movies, music, and books.

2. Risks of Social Networks

The following are the risks of the internet.

- Being exposed to inappropriate content; like mean, aggressive or sexual comments or images;
- Uploading inappropriate content; like photos or videos of themselves or others;

- Sharing personal information with strangers for example, phone numbers; date of birth or location;
- Cyber bullying, that is, using digital technology to deliberately and repeatedly hurt someone;
- Online bullying or harassment;
- Exposure to too much targeted advertising and marketing.
- Personal information being stolen;
- Untrustworthy and misleading content is easy to find on social networks.

Activity 4.3

1. Do you often use the social networks such as Facebook and telegram?
2. About how many hours a day do you use the social network?
3. Who uses the social network most in your family?
4. What purpose does she /he use this social network for?

Summary

In this unit, you have learned about computer network, internet, internet service, WWW, and HTTP, as well as how to browse information, emails and different social networks.Input devices are any computer hardware equipment used to enter the data to the computer.

- Computer network is a group of two or more computer Systems connected to each other.
- Internet is network of networks which connects millions of computers in the world.
- The major internet services are World Wide Web, E-mail, Telnet and File transfer protocol.
- World Wide Web is a collection of websites or web pages known as Web.
- There are static and dynamic web pages.
- File transfer protocol is internet service which is used for transferring files from one system to another using inter net.
- The HTTP stands for HyperText Transfer Protocol and is used to access data on the World Wide Web.
- HTTP has a server (service) and client (request) commu nication protocol.
- Browsing information is the process of searching or find ing information on the internet.
- Search engines like Google make information search easy.
- Email is a way to send and receive messages across the internet.

Review questions

Part I: Match column "A" with column "B".

A	B
1. Web browser	A. Network of networks
2. Dynamic web page	B. an address to a web page on the internet
3. WWW	C. a group of two or more computer systems connected together
4. Internet	D. inventor of the Web
5. Static Web page	E. Google Chrome
6. Uniform Resource Locator	F. a collection of websites
7. Web site	G. The information changed depending on the viewer and the time of the day.
8. Tim Berners-Lee	H. It contains only static information
9. Computer Network	I. a protocol identifier
10.HTTP	J. a collection of web pages
	K. resource name

Part II: For each of the following statements choose the correct answer

1. Which of the following is not a social networks platform?

   A. Facebook C. Linked In

   B. Telegram D. None

2. Which one is not the major service of internet?

   A.World Wide Web C. File Transfer Protocol

   B. E-mail E. All

3. _____ is social network used for link professional networking.

   A. YouTube C. Linked In

   B. Twitter D. Telegram

4. The compose pane is used to_____.

   A. Read the message C.Forward message

   B. To create email message D. None

5. One of the following is not a protocol?

   A. HTTP C. FTP

   B. IMAP D. None

Part III: Fill each of the following blank spaces with correct answer

1. Web page is viewed using a _____.
2. The two components of URL are _____and _____.
3. A _____ web page remains the same until it is updated.
4. _____ is used to transfer files when it is difficult to transfer using email.
5. HTTP is used for formatting and transferring web page data over the _____.

UNIT 5 Computer Ergonomics

Unit Outcomes

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

- *describe computer ergonomics;*
- *demonstrate skills in the proper handling of portable devices;*
- *identify the proper utilization of smartphone.*

Overview

In this unit, you will learn about computer ergonomics, proper handling of portable devices and workstation ergonomics. The unit also addresses the recommended principles of healthier seating style while using computer, ergonomic guidelines and the proper utilization of smart phones.

5.1. Introduction to Computer Ergonomics

Brainstorming activity

- Do you think inappropriate seating style while using a computer causes health risks?

Computer ergonomics deals with the interaction of the user's, their work bodies on a computer in order to minimize risks of health associated with improper sitting on the computer. Computer users take more hours a day to use a computer without knowing its consequence on their bodies. There are many health risks while inappropriately sitting on the computer frequently. For example, contraction of muscle, pain, injury, and backaches are some of the consequences of the inappropriate seating on the computer. Figure 5.1 shows the appropriate way of sitting and handling of the mouse and keyboard of a computer.

Activity 5.1

- Do you think that the way we are sitting on comput er affects our physical body structure and health? Discuss with your classmate.

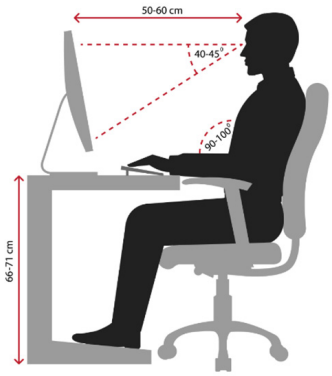


Figure 5.1 Appropriate Sitting in front of computer

Activity 5.2

- From the Figure 5.2 below, which one is the appropri ate sitting style on a computer? Discuss with your classmates.

Figure 5.2. Inappropriate and appropriate sitting on the Computer

5.2. Workstation Ergonomics

Computer has a consequence on physical body of users. Many users take more time to sit and use a computer. The use of computer for long hours can cause muscle diseases and injuries which lead to disorders. The goal of ergonomics is to prevent soft tissue injuries and muscle disorder. Therefore, the workstation of users and the way users are sitting should be appropriate. See Figure 5.3 below.

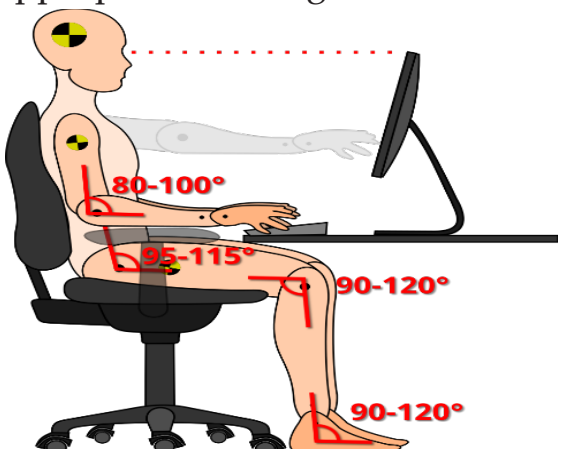


Figure 5.3. Workstation Setup

Ergonomic workstation set-up:

The following are principles recommended for healthier use of computer.

- Elbows: above the desk, at 90-110 degrees.
- Shoulders: relaxed as opposed to hunched.
- Wrists: in line with forearms.
- Hips, knees, and ankles: at 90 degrees whilst seated.
- Feet: flat on the ground or footrest and for prolonged standing.
- Head: upright with ears aligned with shoulders.
- Eyes: looking at the top third of the screen.
- Seat length: should be enough to provide support be neath thighs.
- Backrest: angled at 90-110 degrees with adequate lumbar Support in line with lower back.
- Keyboard and mouse: keyboard aligned with your nose, mouse gripped loosely.
- Laptop: used with a riser, external keyboard and external mouse.

General Ergonomic Guidelines

The following tips are designed to reduce the risk of stress, physical injury and eyestrain while using computer.

- Keep your head and neck in upright position.
- Face your computer screen directly.
- Keep your elbows comfortably close to your body.
- Use a chair that provides support for your lower back.
- Keep your mouse close to your keyboard.
- Adjust the position of your display to prevent reflections of overhead and outdoor lighting appearing on your screen.
- Put your monitor close enough to your eyes.
- Use a hands-free headset when talking on the phone.

5.3. Careful Handling of Portable Devices

Brainstorming activity

- How do you handle portable devices carefully?

Portable devices are useful part of our daily lives. In fact, smartphones cause inconvenience in our daily lives. It could also cause serious health issues due to long-term use of handheld devices. Some of the portable devices are displayed in Figure 5.4 below.

Figures 5.4. Portable devices

Let us see how to use smartphones and mobile devices safely.

1. Avoiding Long Conversation

Long hour's use of smartphones and mobile devices without proper headphones causes heating effect on brain cells. Long conversation could harm our muscle, skin and ear.

2. Using Headsets or Speakerphone Option

The use of good wired or wireless headsets reduces the risk of harming brain cells. Make use of speakerphone options whenever possible.

Figure 5.5 Headset

3. Keeping Mobile Devices away from your Body

All transmitting devices should be kept away from your body. Avoid any direct contact with body and keep it inside a bag. While sleeping, keep your mobile devices away from your bed and switch off mobile data and wireless options. See Figure 5.6.

Figure 5.6 Phone Away

4. Turning off Cellular Data and Wireless Devices

Turn off phone's cellular data, wireless option and Bluetooth when not in use. Before sleeping, it is recommended to turn off all wireless transmitting devices. Mobile device is always connected to wireless data at home and in office. Applications on mobile devices are continuously running in the background, so turn off the data and wireless option to stop communicating. See Figure 5.7.

Figure 5.7 Turn off cellular device

5. Avoiding Calls at Places with Low Signal Reception

In order to keep connected with mobile tower, mobile devices increase transmission power if the signal reception is poor. Avoid places where signal reception from mobile tower is very poor. Avoid phone calls while travelling on a vehicle. Cell phones continuously send signals to maintain contact with cell towers and that could cause the mobile device to transmit high power radiation than in idle condition. See Figure 5.8 below.

Figure 5.8. Poor Signal

6. Fewer calls More Texts

Sending text messages is safe as compared to long calls.

Texting allows keeping the cell phone away from body and shorter duration of transmission which is much safer compared to longer calls. See Figure 5.9 aside.

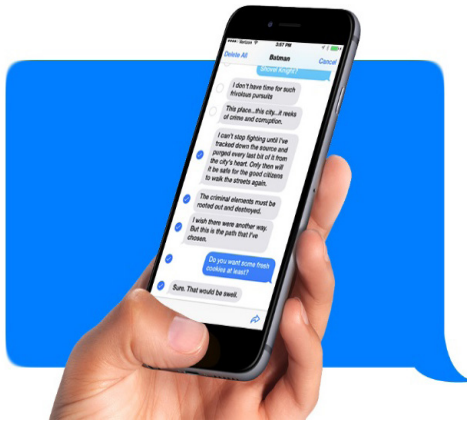


Figure 5.9 Short Text Message

7. Using Landline Telephones

Calls using landline telephones are the safest way to reduce the use of

mobile phones and cordless phones. Make use of landline phones at office and home for long conversations. See Figure 5.10.

Figure 5. 10. Landline phone

5.4. Proper Utilization of Smartphone

Brainstorming activity

- What are the proper ways of utilizing smartphone?

Now smart phone users have many more options in terms of how to engage with technologies, making the focus on health and comfort. Smartphone has become a common place device and a challenge as well. Here are some tips that can considerably help reduce health risks:

- Do not play games all the time.
- Avoid browsing unnecessary links.
- Do not capture photo and share it.
- Do not text insulting messages.
- Take a break from your phone.
- Further away the phone from your body.
- Use a land phone for calling purpose.
- Do not use a mobile phone when crossing the road.

- Do not use your mobile phone in places where there is a lot of electrical equipment.
- Keep your phone on silent mode when you are in public places.

Summary

In this unit, you have learnt about computer ergonomics, skills for proper handling of portable devices, and proper utilization of smartphone. The following are summary of this unit.

- Ergonomics is the study of the relationship between us ers, their work and their physical work environment.
- Ergonomics is optimization of physical hardware to ben efit the health of the user.
- The goal of ergonomics is to prevent soft tissue injuries and muscle skeletal disorders.
- A portable device is a small form of a computing device designed to be held and used in the hands.
- Portable devices are becoming an increasingly important part of personal computing as the capabilities of devices like smartphones, laptops, tablets and notebook continue to improve.
- Proper utilization of portable devices includes avoiding long conversation, using headsets and speakerphone option, keeping mobile devices away from your body, turning off cellular data and wireless devices while sleep ing, avoiding calls at places with low signal reception, fewer calls more texts, using landline telephones and keeping cell phone away from children.

Review Questions

Part I: Say "True" if the statement is correct and "False" if it is incorrect

1. Cognitive ergonomics is the protection of computer systems and information from harm, theft, and unauthorized use.
2. The goal of ergonomics is to prevent soft tissue injuries and musculoskeletal disorders.
3. The term ergonomics is rooted from organizational and physical ergonomics.
4. The over use of computer has associated with humans health problems.
5. Children are more sensitive to radio frequency radiation due to their smaller head circumference and brain size.

Part II: From the following figures, which is the correct ergonomic seating? Explain it to your teacher.

Part III: Write short answer for each of the following questions

1. List the recommended principles for healthier computer ergonomics at computer laboratory.
2. Write at least four proper usage of smartphones.

UNIT 6 Logic Oriented Graphics Oriented (LOGO) Programming

Unit Outcomes

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

- *explain primitives;*
- *describe the use of variable in writing procedure;*
- *create recurring procedure and*
- *write program using conditional statement;*

Overview

In Grade 7, you have learned about Logic Oriented Graphics Oriented (LOGO) language. You have already known that; LOGO is one of the easiest and simplest computer languages. As you remember, LOGO uses to perform various functions such as drawing figures, typing text and performing calculations. In this unit, you will learn about using variables in writing LOGO procedures and creating recursive procedures in LOGO. LOGO 6.5 b version was used in this textbook; which is available on the site "https://mswlogo.en.softonic.com/download".

Brainstorming activity

- Why do you learn the LOGO language?
- Write some of LOGO turtle commands you learned in grade 7?

6.1. LOGO Primitives

LOGO uses a triangle shaped turtle that moves on the MSW Microsoft Windows (MSW) LOGO screen. The LOGO turtle can draw and perform actions when you give a command. These commands are also known as primitives. Primitives are entered in the bar called command input box. The basic LOGO primitives are shown in Table 6.1 below.

Table 6.1 LOGO Primitives

Primitives	*Meaning*	*Action*
FD	*Forward*	*to move the turtle forward.*
BK	*Back*	*to move the turtle backwards.*
RT	*Right*	*to move the turtle to the right.*
LT	*Left*	*to move the turtle to the left.*
HT	*Hide Turtle*	*to hide the turtle.*
ST	*Show Turtle*	*to show the turtle.*
CS	*Clear Screen*	*to clear the screen and send the turtle to the Home position.*
CT	*Clear Text*	*to clear all the commands in the recall list box.*
HOME	*Home*	*to bring the turtle to its Home position.*
PRINT	*Print*	*to write.*
SUM	*Sum*	*to add two numbers.*
DIFFERENCE	*Difference*	*to subract one number to another.*
PRODUCT	*Product*	*to multiply to number.*
PU	*Penup*	*to moves turtle without line.*
PD	*Pendwn*	*to puts the pen down, and starts drawing again.*
Sqrt	*Square Root*	*It takes a non-negative and returns its square root.*
Exp	*Exponential*	*It bends an argument and compute e to this power, e is the natural number 2.718281828.*

6.2. Variables in LOGO

A variable is the name of a memory location which can contain a value. Variables are given names which are strings of letters. A variable name can contain alphabets, digits and underscore. Variables are like containers; they contain some "thing" inside. This topic discusses how to make your own variables, how to get at the "thing" inside. Every variable has a name and a value associated with it. A name is a word, just like the words you have used for the names of turtles. A variable is something that can vary.

To define a variable in MSW LOGO, use a statement in the form:

MAKE "variableName value

e.g. **make "size 10**

In this example ,the variable called "**size**" will now have a value of **ten (10).**

If you want to make use of a variable in a procedure, you must refer to it by writing a colon (":") in front of the variable name. In the example above you would refer to the variable in the form - **: size**. If you just write the word "size", without the colon, MSW LOGO will treat it as a text, rather than the value it contains.

Example .

make "size 60

print :size/2

There are several ways to give a value to a variable. An explicit way to do this is described below. An implicit way will be seen when we introduce procedures. A variable can be given a value with the make command, as shown below.

make "size 60

This command gives size to the value 60. Note that in this case, we have used ``size, not :size. The reason is that: size is the value of the variable size, while ``size is its name. We say that ``size is the ``quoted name'' of size. LOGO tries to ``evaluate'' words as it reads them because some words are the names of procedures. We quote words to tell LOGO, that they should not be evaluated. In LOGO variables do not have types, nor do they have to be declared before used.

```
make "size 60
print :size +2
print :size-2
print size*2
```

Now let us give the variable **name** a value which is the name of the Hello. Try executing the following commands in the command window.

```
make "name  "Hello
print :name
```

Note that we quote the name of the variable name in the make command but we use the colon version to obtain its value. Hello is quoted so it is recognized as string and not as a variable. Its output is Hello.

6.3. Recursive procedures

When you use LOGO, each time you type a command (or a set of commands), the turtle moves immediately. However, the turtle does not "remember" how to make the shape. To create the shape again, you need to type the commands again. A procedure is a way to make the turtle remember a set of commands.

Each procedure is given a name (e.g., SQUARE or HOUSE or BIG,RED. THING). The name may not include spaces. Creating the procedure is like teaching the LOGO turtle the meaning of a word. For example, we can teach the turtle that the word SQUARE means REPEAT 4 [FD 50 RT 90]. Afterwards, every time we type the word SQAURE, the turtle will know what to do. Procedures are kept in memory as part of a LOGO workspace. The workspace is a collection of all the LOGO procedures currently in memory. These workspaces can be saved and loaded, just like other documents.

Creating a Procedure using TO

All LOGO procedures actually have the word 'TO' as part of the name (e.g., TO SQUARE or TO HOUSE). All versions of LOGO allow this method for creating procedures. To begin a procedure, type the word TO and a name for the procedure. For example, you could type TO NAME or TO TRIANGLE.

Creating a Procedure using EDIT

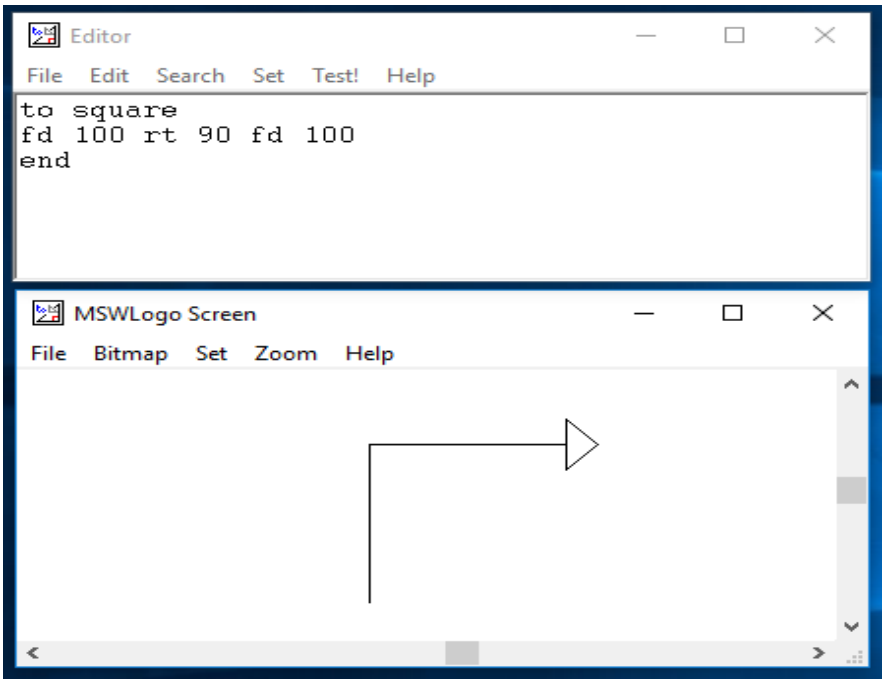
There is no space between the quote and the name of the procedure. There is no quote after the procedure name. Many LOGO commands follow this pattern.
You will probably see the following two lines in the editing window when you begin a new procedure:

TO SQUARE
END.

You will be typing the commands between these two lines, so you may need to press Return/Enter to open up a space to type.
Finishing and saving a procedure using EDIT will depend on the version of LOGO you are using. There may be a menu item such as "Save and Exit". The simplest way is to attempt to close the editing window. The computer asks you if you want to save the changes.

Example: To display the output of fd 100 rt 90 fd 100 procedure in MSWLOGO;

1. Open MSW LOGO;
2. Go to MSWLOGO screen;
3. From the MSWLOGO screen menu, click on File then edit;
4. Type square on Edit Procedure form then ok;
5. Then editor automatically displays form as follows.
6. To square
7. End
8. Type the above procedure between to square and end;
9. Then click on File and then save and exit;
10. Then on the commander command, enter box type square, click execute and you get the following output shown in figure 6.1.



Activity 6.1

Create the following procedures and view their output.

a.

```
to square
fd 100 rt 90 fd 100 rt 90 fd 100
end
```

b.

```
to square
fd 100 rt 90 fd 100 rt 90 fd 100 rt 90 fd 100 rt 90
end
```

In a recursive procedure, there will be a call of the procedure within the procedure. First of all, just what is a procedure? Let us look at it this way. What procedures do you follow when you wake up in the morning? You get out of bed. Some people have a lot of trouble with that. You get cleaned up, put on your clothes, eat your breakfast, brush your teeth, and go to school or elsewhere. Procedures are how you do things, the steps you take to make something happen. LOGO procedures are things you teach LOGO to do. They include all the

steps LOGO must take to make something happen.

When a procedure invokes a copy of itself, it is said to be recursive. The meaning of recursive procedures is obtained in exactly the same way as regular procedural invocation, namely, via the copy rule. An example of a recursive procedure is given below.

```
to star

repeat 100 [fd 100 rt 144]

end
```

The above recursive procedure output is displayed below.

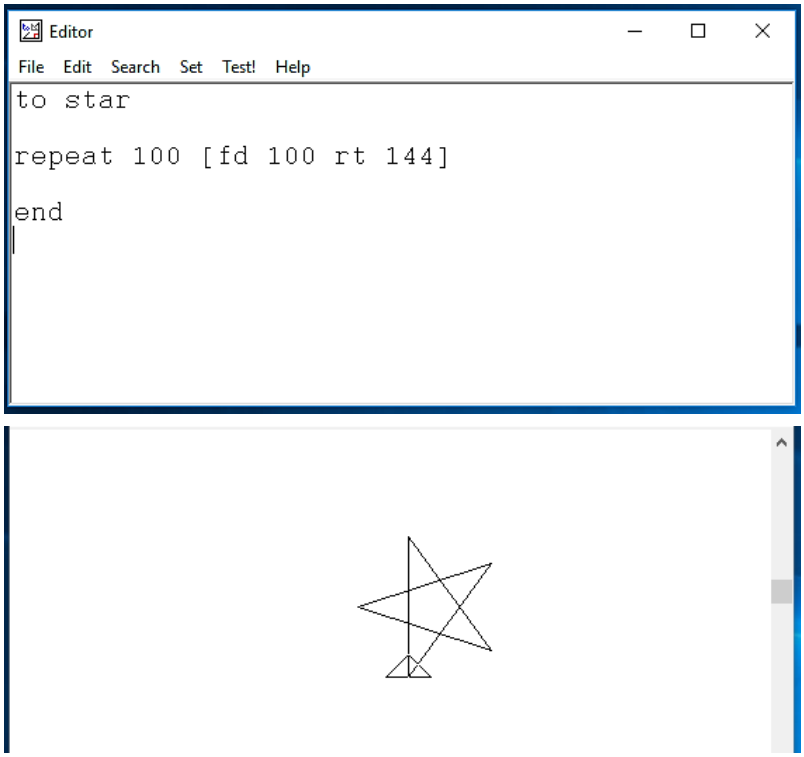


Figure 6.2: Code and Output

6.4. Conditional Statements

Conditional statements are statements that are used to decide whether or not the condition is true or false. Conditional statements always have **if** part which tells the application what to do when the condition is true. Conditional statements also usually have an **else** part, which

tells the app what to do when the condition is false. If you leave out the **else** part then your application will do nothing when the condition is false.

Conditional Command: if else

General form:

ifelse [true/false condition][action if true][action if false]

Example 1

```
make "variable1 23  // variable 1 is equal to 23
make "variable2 23  // variable 2 is equal to 23
ifelse :variable1 = :variable2 [print [It's TRUE]][print [It's FALSE]]
```

In MSWLOGO editor the above example 1 code is written as follows.

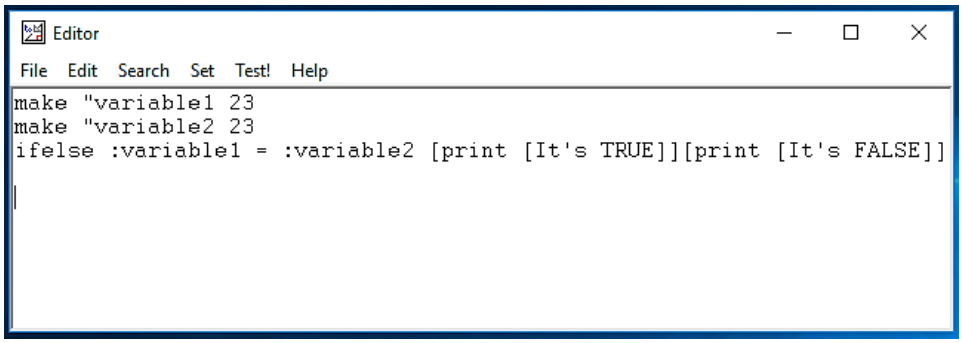


Figure 6.3: Example 1 code in LOGO

The MSWLOGO display the output for the above example 1 code as follows.

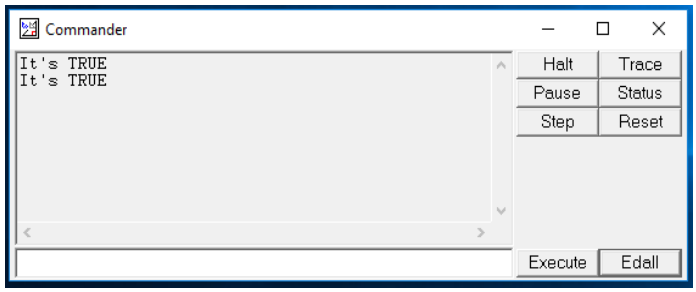


Figure 6.4: Output of example 1

Example 2

```
make "variable1 23 // variable 1 is equal to 23
make "variable2 25  //variable 1 is equal to 25
ifelse :variable1 = :variable2 [print [It's TRUE]][print [It's FALSE]]
```

In MSWLOGO editor the above example 2 above code is written in the following way.

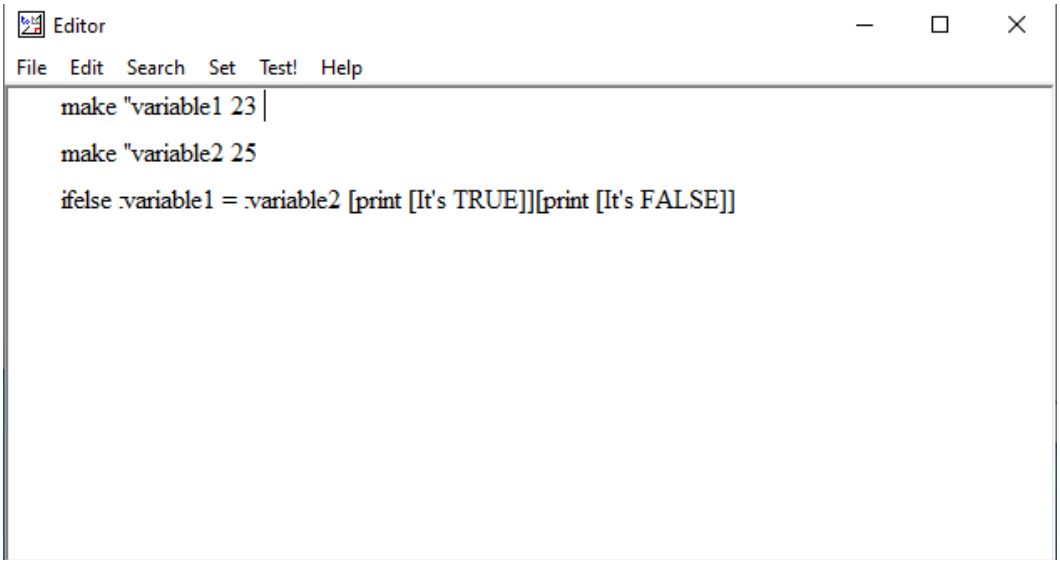


Figure 6.5 Example 2 code in LOGO

The MSWLOGO displays the output for the above figure 6.6 as follows.

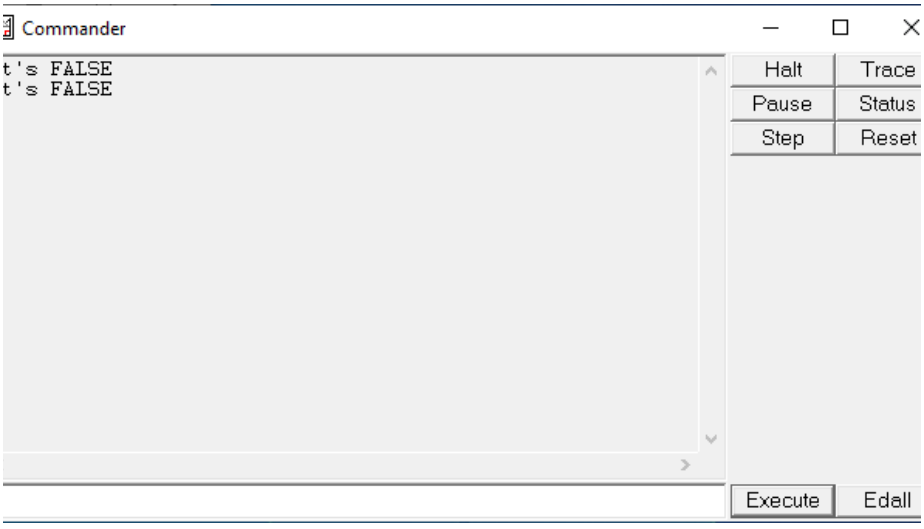


Figure 6.6: Output of example 2

Conditional Command: Using **until** and **while**

General form:

until [condition][action]
while [condition][action]

make "count 1
until [:count > 5][print :count make "count :count + 1]

Output: 1 2 3 4 5

make "count 5

while [:count < 10][print :count make "count :count + 1]

Output: 5 6 7 8 9 10

Conditional Command: do.until, do.while

do.until *and* **do.while** *are effectively the same as* **until** *and* **while** *except that the <action> and <condition> are reversed.*

Using **until** *and* **while**

General form:

do.until [action][condition]
do.while [action][condition]

make "count 1
do.until [print :count make "count :count + 1][:count > 10]

Output: 1 2 3 4 5 6 7 8 9 10

make "count 1
do.while [print :count make "count :count + 1][:count < 10]

Output: 1 2 3 4 5 6 7 8 9

Activity 6.2

Find the output for the following LOGO programs

1.
```
make "variable1 50
make "variable2 51
ifelse :variable1 = :variable2 [print [It's TRUE]][print
 [It's FALSE]]
```
2.
```
make "count 12
until [:count > 20] [print :count  make "count  :count + 2]
```
3.
```
make "add 1
do.until [print :add  make "add  :add + 5][:add > 15]
```
4.
```
TO SQUARE
REPEAT 4 [FD 100 RT 90]
END
REPEAT 20 [SQUARE RT 20]
```

Summary

In this unit, you have learned about primitives, variables, procedure and conditional statements in LOGO programming.

- Primitives are commands in LOGO programming.
- Variable is the name of a memory location which can con tain a value.
- Variables are given names which are strings of letters.
- Procedure is a way to make the turtle remember a set of commands.
- Creating the procedure is like teaching the LOGO turtle the meaning of a word.
- Recursive is a procedure that invokes its own copy.
- Conditional statements are statements that are used to de cide whether or not the condition is true or false.

Review Questions

Part I. Say "True" if each of the following statements is correct and "False" if it is incorrect.

1. After a variable, there is always a quote.
2. Colon is used to refer to the variable in LOGO programming.
3. A procedure is a way to make the turtle remember a set of commands.
4. Recursive procedures cannot be written in LOGO.
5. Recursive procedure is a call for the procedure within the procedure.

Part II: Write the correct answer on the blank space provided.

1. A_____ is the name of memory location that contains a value.
2. A LOGO procedure is called _____ if it calls itself as a sub procedure.
3. The _____is used to clear all the commands in the recall list box.
4. _____ are entered in the bar called command input box.
5. All LOGO procedures have the word _____ as part of their name.

Glossary

- **Application software**: is computer program designed to help users to perform an activity.
- **Artificial intelligence (AI)**: refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.
- **Browser:** is a software program that allows viewing webpages.
- **Computer:** is an electronic machine that can store and process data; it has hardware which is the machine itself, and software which is a set of instructions.
- **CPU:** is a brain of the computer where programs are run.
- **Cyberspace:** is a world of computer networks.
- **Desktop**: is a full size computer with a central processing unit (CPU) connected to a monitor.
- **Domain Name:** is a unique name that identifies a specific computer on the internet.
- **Download**: is a term for transferring software or other files from one computer to another.
- **Driver software**: is a type of software that controls hardware devices such as microprocessor, memory, hard drive, and peripherals devices.
- **Email address**: The way a specific user is identified so that they may receive email.
- **Email**: is messages sent from one specific user to another using the Internet.
- **Ergonomics:** deals with the interaction of the user bodies on a computer in order to minimize risks of health that associated with improper sitting on the computer.
- **External hard drive**: is a device that acts like a computer hard drive without being installed in the computer; it is plugged into a computer

via a port.

- **External Hard Drive:** is a storage device that serves as an extra hard drive used for additional or backup storage.
- **Hard Driver**: is an input/ output device that serves as the long-term storage memory of the computer.
- **Home Page:** is a first page of a Website, it is similar to a table of contents.
- **HTML:** is a computer language used to make hypertext documents that are sent via the World Wide Web and viewed using a Browser.
- **HTTP**: is a way that hypertext documents are transferred over the Internet.
- **Hypertext**: is a way of presenting information that allows words, pictures, sounds, and actions to be inter-linked so that you may jump between them as you choose.
- **Integrated circuit**: refers to a small electronic device developed from semiconductor materials.
- **Keyboard**: is where all the letters, numbers and other buttons are located; when you type on it, the symbols appear on the monitor.
- **Laptop**: is a small portable computer.
- **Link:** is a word, phrase, or image that allows you to jump to another document on the World Wide Web.
- **Microphone:** is a device, which allows you to talk to others through your computer provided that you are connected to them via a communication application.
- **Modem:** is a device that allows a computer to connect to the intranet.
- **Monitor:** is an output device that displays information visually.
- **Motherboard**: is a circuit board that holds and connects various components of the computer and allows their

communication.

- **Mouse:** is a little device you move with your hand, which then moves the cursor on the screen.
- **Operating System**: is software that communicates with the hardware and allows other programs to run.
- **Optical Driver**: is an input/output device that reads data from and writes data to CDs and DVDs.
- **Peripheral:** is an accessory that you use with your computer; not part of the computer itself, but it connects to the computer via a cable or wireless access; for example, printers and scanners.
- **Printer:** is a device that prints out data sent from the computer onto paper.
- **RAM:** is a computer's high-speed, short-term memory. It temporarily stores data and instructions for programs that run on the computer.
- **Scanner:** is a device that scans something that is flat and sends the image to the computer.
- **Search Engine:** is a website that indexes and allows searching of information gathered from the internet.
- **Smartphone**: is a portable device that combines mobile telephone and computing functions into one unit.
- **Speakers**: are devices that the sounds come out of; they are sometimes built into the monitor.
- **Touchpad**: is an area on a laptop that substitutes for a mouse; you move your finger around on it to move the cursor.
- **Transistor**: is an electronic device used to control the flow of electricity in electronic equipment.
- **URL:** is a uniform resource locator -The entire address for a piece of information of the internet. E.g., www.google.com
- **Utility software**: is system

software used to solve a particular problem of a user.

- **Vacuum tube**: is an electronic device that controls the flow of electrons in a vacuum.
- **Very Large Scale Integrated circuit:** is the current level of computer microchip containing hundreds of thousands of transistors.
- **Webpage:** is a hypertext document available on the World Wide Web.
- **Website**: is a collection of webpages.
- **World Wide Web:** is a collection of resources available on the internet using a web browser.

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