**AN INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGY**

**FOR DIPLOMA IN BASIC EDUCATION (DBE)**

**(BY DISTANCE)**

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# PREFACE

This instructional manual is published in fulfilment of distance learner’s need for a comprehensive handbook that offers a unique strategy for success by way of effective organisation of study manual in simplified and logical development of material with the sole aim of providing a guided approach in self-tuition.

The construction of the entire material is simplified from leading professional sources and renowned publications in information and communication technology and hence presents an integrated outlook for an increased understanding of the principles and theories underlying information and communication technology studies.

The manual particularly offers a unique approach for success by way of provision of copious answered model questions that are purposely designed for repeated practice and developing the requisite skill and confidence that comes about for tackling problems involving information and communication technology and its effectiveness in teaching and learning.

The writers draw a wide range of experience from their teaching career and appreciation for trainees’ difficulties in using I. C. T. in teaching and learning.

This manual is intended to provide for the needs of teacher trainees and candidates of colleges of education. It will also provide useful information to teachers in the use of computer in teaching.

The first unit discusses a world of computers; which includes the following topics;

1. Meaning of computer
2. Importance of using computers in education
3. Types of computer
4. Computer systems and their function.

Unit two involves the various software and their application and communication and network. The final unit talks about computer security and multimedia in teaching.

It is hoped that, this manual will prove a useful guide and an important source of reference to teachers in the teaching and research efforts.

# ACKNOWLEDGEMENT

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# COURSE INTRODUCTION

# INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGY

**Introduction**

Dear learner, you are welcome to the course “Introduction to Information and Communication Technology”. This course is intended to help you integrate information and communication technology into the teaching and learning process. Again it is intended to help you to understand the changing technological developments in the world with particular reference to the teaching and learning environment.

**Objectives**

By the end of the course you will able to:

1. Explain the meaning of a computer system
2. Identify the parts and functions of computer systems
3. State the type of computers
4. State the importance in the teaching and learning environment
5. Explain the concept software and its applications
6. Explain communication and network and their roles in the teaching and learning process
7. Explain the processes involved in protecting the computer from breaking down.
8. Discuss the importance of multimedia in the teaching and learning process.

We wish you good luck and have confidence in you and your ability to successfully work through this course module. We hope that you will enjoy the lessons therein.

# UNIT 1

# A WORLD OF COMPUTERS

**Introduction**

Dear learner, you are welcome to the first unit of the course. The world today is changing and as such there is the need for us to also catch up with the advanced countries so far as the use of computers is concerned. Today, every body is talking about the computer, so we are going to look at what it is and why the use of computers. Relax and enjoy the lesson.

**Objectives**

By the close of this unit, you will be able to state:

* The meaning of a computer
* Name some parts of the computer
* List the types of computers
* Discuss the importance of computers in educational institutions
* Explain and identify the components of a computing system and
* How computers functions

# UNIT 1 LESSON 1

# MEANING OF COMPUTER

Dear learner, you are welcome to the first lesson in Unit One. In this lesson we shall be looking at the definitions of computer and identify some components of it. Enjoy yourself, but do well to take note of the objectives and the progress tests below each lesson.

**Objectives**

By the end of this session, you will be able to

1. Explain the meaning of a computer
2. Explain computer literacy
3. List at least four parts of a computer

**What is a Computer?**

**Activity 1**

Think over the meaning(s) of computers and use your own words to describe it.

Have you ever make use of the computer? What about mobile phones, telephones, televisions, watches or calculators?

I believe you must be in a happy mood by now because all these mentioned devices are computers. So now, what will you say is computer?

A computer is an **electronic** **device** capable of **accepting data** in a convenient form, which is automatically **processed** following a sequential set of instruction called program, which is also **stored** in a device, and **producing** results known as **output** or **information**.

A computer is a programmable multiuse machine that accepts data (raw facts and figures) and processes or manipulates it into information that can be used such as summaries or totals.

A computer is any electronic device which is capable of accepting raw data, processes the data using a given set of instructions to produce the expected results (output) which we call information and stores or saves the output for future use by any suitable storage medium.

A computer can also be said to be a device that has ability to accept data, internally store, and execute a program of instructions, perform mathematical, logical and manipulate operations on data, and accept the results.

A computer is a versatile electronic device that accepts input (data) process, stores and gives feedback (output).

From the above definitions, we need to explain certain keywords in them.

**Keywords in definition(s)**

Computer is an **electronic device** because it uses electrical currents in performing its’ activities. We all know the state of electricity as **off** and **on** or absent or present of electrical pulse, which is represented in computing as **0s** and **1s**. These discrete values (0s and 1s) is what the computer uses to represent data and information.

The **computer accepts** data; accepting data, here means that anything that you send into the computer be it quantities, characters, or symbols on which operations are performed.

The **computer processes** data means changing the data into meaningful information based on the instructions given. The computer gives out information after the processing.

**Data:** Data comes in many forms; numbers, words, symbols. Data related to transactions, events and facts and on its own, it is not very useful. ***Data*** can be defined as the streams of raw facts and figures fed in to the computer to be processed before people can understand and use.

**Input:** It is the name given to the data fed (received) into the computer for processing.

**Output:** it can be defined as the process of displaying or printing the results of processing operations. This output refers to the expected result or information.

**Information:** refers to data that has been refined (converted or shaped) into a meaningful and more useful or intelligible form or context for an end user. ***Information*** is also data that has been processed, i.e. organized into a form that people can understand and use.

**NB** Information is always made up of data, but not all data produce meaningful information. And someone information can be another persons’ data.

Dear learner, let’s consider these terms *data* and *information* very well. Sometimes these words are used inter-changeably but it is important to know the distinction between them. ***Data*** refers to the raw material from which useful results can be extracted and it is the valued added or usefulness associated with ***information*** which distinguishes it from data organized with respect to user requirements. (There will be further elaboration in our subsequent lessons).

**Computer Literacy**

Dear learner, in your own words can you explain what computer literacy is?

We believe what you have said is in line with what has been explained below.

Literacy is the ability to read and write. In modern context, **the word means reading and writing in a level adequate for written communication and generally a level that enables one to successfully function at certain levels of a society.**

There are **so many** types of literacy such as business, media, information, computer, technology, visual, and health, but for the purpose of this course in computing, the following will be considered: Computer literacy

**Computer Literacy**

There are so many definitions on computer literacy as outlined below:

1. It is the level of expertise and familiarity someone has with computers and its applications.
2. It is the knowledge and ability a person has to use a computer and technology efficiently.
3. It is the comfort level someone has with using computer programs and other applications that are associated with computers.
4. It is the knowledge and ability to use a computer and its software efficiently to accomplish practical tasks.
5. It is the understanding of the concepts, terminology, and operations that relate to general computer use.

Individuals who are very computer literate are sometimes called “Power Users”. Such a person should know how computers work and operate, that is how to turn on a computer, start and stop simple applications programs, save and print information. Perhaps the simplest way to explain computer literacy is the ability of one to understand how to use computers and also how others use computers.

**Importance of Computer Literacy to the Trained Teacher**

1. Computer skills are a subject being specifically taught in schools especially from puberty where the ability of abstraction forms.
2. Computers are used in teaching and learning. It is an integral part of the educational system and the trained teacher needs it in other to function effectively.
3. Computers are also used in schools for many applications such as in writing papers or in research especially on the internet to search for information.

**Parts of a Computer System**

Having known the meaning of computer and computer literacy, just like the human body which has got parts, examples eyes, mouth, hand, etc, the computer system has also got parts.

Let’s now look at the parts of the computer system.

Some of the parts of the computer are: system unit (system box), monitor, mouse, speakers and keyboard etc.

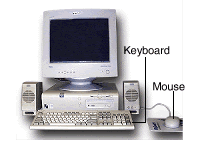
There are **three** main parts of the computer namely the

* **Keyboard**; The component that closely resembles the typewriter is called the **keyboard**. It serves as a medium for sending data into the computer for processing. 2 types of keyboard; **QWERTY** and **DVORAK.**
* **System unit**; It is the rectangular box, which houses the most of the electronic components that make up a computer system. For microcomputers, there are four basic types; **Desktop , Notebook, Tablet PC** and **Handheld system unit**
* **Monitor**; The **TV**-like device is called the **monitor** or **VDU** (Visual Display Unit), is a screen (Visual Display Unit) that displays processed information to the user. 2 types are; **Cathode-ray tube** and **Flat Panel monitors**.

The mouse has become a **fourth** integral part of the computer of late due to its versatility.

Monitor

System unit



Keyboard

Mouse

The tiny device connected to the system unit through a chord resembling a tail is called a **mouse**. The **mouse** is the hand-held device that lets you point, click and move objects on the monitor (screen).

**Summary**

We hope you have enjoyed reading this lesson. In this lesson we discussed the meaning of the computer as an electronic device that accepts data, processes it, stores and retrieves according to the users’ instructions and gives out information.

We also discussed parts of the computer and computer literacy as the knowledge and ability a person has to use a computer and technology efficiently. Lastly we’ve explained the three main part of computer.

**Progress Test**

1. Briefly explain the meaning of computer
2. List five parts of the computer
3. List the main part of the computer

# UNIT 1 LESSON 2

# IMPORTANCE OF COMPUTER

**Introduction**

Dear learner, you are welcome to lesson 2 or Unit 1. In lesson 1 of Unit 1, we discussed the meaning of computer and the parts of the computer. We hope you have taken note of all the important issues discussed. Excellent

In this lesson, we shall be looking at the importance and some of the disadvantages of using the computer

**Objectives**

By the end of the lesson, you will be able to

1. list at least five importance and some disadvantages of using the computer

**Activity 1**

The importance of computers in our daily lives cannot be over-emphasized.

Discuss

……………………………………………………………………………….

……………………………………………………………………………….

I hope your answers fall in line with the following:

Computers play major role in our daily lives. They are used in schools, government offices, industries and shops. You can use computer to communicate with your love ones, being it your family or friends, create household budget, book travel and movie tickets, or manage your small business.

Let take a keen note on major areas that computers are used for its importance. Our emphasis will dwell much in the field of education in general, and then we look at the benefit in using computer to the teacher and the student.

**In Education**

* For presentation of learning materials. The computer, projector and others have been used to present lesson in education fields.
* Demonstration of concepts and theories
* Interaction and collaboration with other students and members of the learning community. This has been possible through teleconferencing that is an interactive electronic communication among people at different locations.
* Practicing and training of relevant skills. The computer and the internet have helped to gain access to information in areas of study.
* Facilitate e-learning
* Assist students to prepare and do their assignments.
* Help teachers to keep track of lessons, assessments and grades of students.

**Benefits to students**

* **S**tudents who use computer in school are more motivated to learn and have increased self-confidence and are generally successful.
* It encourages the student to be independent and active in his/her learning and be self-responsible.
* Gains in understanding and analytical skills, including improvements in reading comprehension
* It helps students to development writing skills (including spelling, grammar, punctuation, editing and re-drafting), and elaboration
* Flexibility of ‘anytime, anywhere’ access
* It helps students to develop higher level of learning styles
* It allows the student to gain understanding and analytical skills, including improvement in reading comprehension.
* Students find learning in a technology-enhanced setting more stimulating and student centered than in the traditional classroom.
* It gives students the opportunity to collaborate on assignment with each other, outside or inside the school.
* It gives students the opportunity to address their work to an external audience (e.g. Power Point presentation).
* It allows students to download web hosted educational multimedia resources.
* Computers are used in writing documents
* Computers are used in searching the Internet for information

**Benefits to teachers**

* There is greater flexibility in carrying out their work as teachers.
* They gain computer literacy skills, confidence and are enthusiastic about their work.
* Easier planning and preparation of lessons and designing materials
* Access to up-to-date pupil and school data, anytime and anywhere
* It enhances the professional image of teachers.
* Computer use during lessons motivated students to continue using learning

outside school hours

* Higher quality lessons through greater collaboration between teachers in planning and preparing resources.

The use of computers in education helps to develop or discover better alternative means of carrying out the educational process. Experience around the world in developing, industrialized and information-based nations has improved that training in the use and application of technology is the prime determining factor for improved student performance (in terms of both knowledge acquisition and skills development enabled by technology).

In business and industry, you use computers to maintain accounts, create personnel records, track inventory, prepare presentation and reports, manage projects, and communicate by e-mail. You can use computers to design any type of publication ranging from simple newsletters to fashion magazines, marketing materials, books, or newspapers. Computers are use to keep track of products and check out at the cash registered. Banks use computers to send money all over the world.

In government organizations, we use computers to organize information by storing and updating records. Computers are also used for providing services to citizens. For example one can view information on current policies and government issues on a computer.

In the field of medicine, doctors use computers to review medical records of patients. Doctors also use computers to find information about latest drug available to treat a disease.

Scientists, use computers for scientific research, and to gather and analyze information. For example they use computers to view images from space and to publish information on their recent research. Engineers use computers to make cars, trucks and airplanes. Architects use computers to design houses and other buildings. The police use computers to track down criminals. The military use computers to make and read coded messages.

In security wise, computer-controlled monitors play an important role in maintaining security in crowded areas such as the airport, banks, large departmental stores etc.

Perhaps the appropriate question at this point is why are computers so powerful?

Discuss the points raised below with your fellow mate(s)

**Why computers are so powerful**

* **Communication**: Computers have communication abilities, which offer an extension capability, together with telephone lines, chatting, video conference, etc.
* **Reliability**: The computer is reliable because of the processing cycle it follows rigidly; the expected results should be achieved. Computers can be counted on to perform. They operate consistently and accurately without fail for long periods of time. They have built-in, self-checking features that assist in their maintenance. Because of its accuracy, computers are reliable.
* **Accuracy**: The computer gives exact information when appropriate input (data) is fed into it. Computers are accurate machines that process large volumes of information according to complex and receptive procedures. Remember that whenever your computer gives you wrong results, it implies that the computer as a wrong data from you, hence “GIGO” (garbage in garbage out).
* **Storage**: Computer can keep or hold data or information permanently for future reference or use. With computers, records are stored on the diskettes that don’t occupy any significant space on the table. In fact billions of characters are stored on disks that virtually occupy a small space.
* **Speed**: Data processing using the computer is not only easy but also fast. computers can calculate tens of millions of times faster than the human brain and in seconds solve problems that would take dozens of experts some years to complete: Computer speeds are measured in four or more ways:
* Millisecond (one-thousandth of a second = 1 x 10-3 second)
* Microsecond (one-millionth of a second = 1x10-6 second )
* Nanosecond (one-billionth of a second = 1x 10-9 second)
* Picosecond (one-trillionth of a second = 1 x 10-12 second)
* Femtosecond (one-quadrillionth of a second = 1 x 10-15 second)
* **Economy**: Computers are economical. Businesses using computers operate more efficiently and effectively since they can reduce labour costs, improve customer service and provide management with fast, accurate information about customers, products and sales. When we go to some hospitals, you will see a room full of patients’ records and fetching takes time.
* **Versatility**: the computer can be used to solve many problems provided a suitable program can be written. It is not like human who is restricted to only one or two professions.

**Disadvantages of using Computers**

The first five points gives it disadvantage in education

1. ICT materials like computer games have actually spoilt some students. It prevents them from studying.
2. Immoral activities go on in the school because of ICT facilities.
3. **Computer breakdown**: when a computer system breaks down or when there is power failure, the computer cannot be used and that highly hinders the work of an organization.
4. **Initial cost:** The initial cost of a large installation is very high. Therefore, it may scare many people and organizations from computerizing their operations. Huge budgetary has to be allocated for ICT development whilst other important aspects of education are neglected.
5. **Computer fraud**: It refers to the illegal use of the computer system or the manipulation of computer programs for personal gains.
6. **Extensive system analysis and programming**: The computer is run by software which is prepared by skilful system’s analyst and programmers. Several years of investigation and preparation may have elapsed before the software becomes operational.
7. **Invisible processing:** Data being operated or processed by the computer is invisible by the human who is using the system or machine. Therefore, he or she cannot appreciate the work of the computer.
8. **Dislocation of employees**: Since computers can combine the work of several employees into software, such employees may be redundant.

**Summary**

In conclusion, you could see that computer play a major role in our daily activities hence the need for us as teacher and educators to really exploit the capabilities of the computer.

**Progress Test**

1. Why do you think teachers should be given extensive knowledge on the computer system?

# UNIT 1 LESSON 3

# COMPUTING SYSTEM (1)

**Introduction**

Dear learner, you welcome to lesson 3 of Unit 1. We believe you can now define and explain what a computer is. Again, we believe that you can also explain what computer literacy is. In this lesson we shall look at what a computing system is and its components.

**Objectives**

By the end of lesson you will be able to:

1. Explain what a computer system is
2. Identify one component of a computing system

**Computing system**

What comes to your mind when you hear about a computing system? Perhaps you are trying to look at the two separate words and trying to get the meaning from that. That is quite good.

Let us now examine the actual meaning of a computing system. We have already examined the meaning of computer. Now let us look at what a **s**y**stem** is. A system is a set of independent parts that together accomplish specific objectives. The components of a system are rationally, rather than randomly, organized and related. Besides good organization, a system is characterized by interrelationships with its parts, and central objectives.

**Activity 1**

Using your experience knowing the meaning of computer and system, can you explain in your own words what a computing system is?

………………………………………………………………………………………………………………………………………………………………………………………………

We hope your explanation of the computing system includes the key components. Congrats!!

Now let us look at a more detailed explanation of what a computing system is.

**Computing System**

Computing system includes more issues when you examine the meaning of computer. A computing system is the combination of hardware, software, data, procedures and you as a human being, all working together to get the most of using the computer. It should be noted that the components of the computing system (hardware, software, data, procedures, people) working together to provide the benefits of using a computer.

**Explanation of Components of a Computing System**

Computing system has five components

* People
* Procedure: rules and guidelines to follow when using the computing system
* Data
* Software
* Hardware

**People**: By far the most important component of a computing system is you as a human being or the person using the computer. You are the controlling office behind the computing system directing affairs and allowing all the components to communicate in a way that will enable the results to be achieved. By knowing the power and limitations of computing, you are able to select the proper applications to solve problems, produce information and become more efficient in your work. Basically there two people who uses computers and without such people computers will be no significance. These people are

* End users, those who use computer to operate (mostly application software) their day-to-day activities.
* Professional user, these are people who have specialized in the system build up and software developers, they include, IT professionals, Network Specialist, Programmers, System Analyst, Database Specialist etc.

**Procedures**: these are rules or guidelines for people to follow when using software, hardware, and data. They are documented in manuals written by computer specialist for particular organizations. Software and hardware manufactures also provide manual with their products. Procedures such as those found in operating manuals and other forms of documentations, are another critical part of the computing system. Without proper procedures, you may be at a loss how to use the computer correctly. Processing data into information requires careful planning and appropriate instructions. If accurate data are not input, the information delivered as output is useless. This phenomenon is called **garbage-in**, **garbage-out**, means that the output is only accurate as the input and the program that process the data. If you enter a meaningless series of numbers and letters, the computer will not automatically process the data into a list of names and address.

Though computers follow a program’s instructions, you as the computer user must know which program to use and how to use it. The documentation manual can tell you how to start a program, which data needed to input and how to verify that the results are accurate.

The next three points will be dealt much with.

**Some Definitions of Data**

Data are raw or unorganized fact, figures, (sound, symbols texts, numbers, drawings etc.) that is yet to be processed by the computer.

OR

Data consist of the raw, unprocessed facts that are yet to be processed.

Data is the basic elements of information that a computer can process or produce. Data are obtained through measurement or observation. Data are the raw materials from which the computer produces information. Data are simply the numbers, symbols, or words events and transactions which have been recorded but not yet processed, into a form which is suitable for making decisions. Data are called raw facts because data alone may have no meaning.

**Sources of Data**

Data can come from many sources, but the main sources of are:

* Internal data
* External data

**Internal Data**

This is the data that is gathered from within an organisation like School, Hospital, and Company etc. This data can be in the form of

* Records of people employed by an organisation(e.g. names, age, salary)
* Data from production department(e.g. number of machines, repair records)
* Data from a school(e.g. names, age, teachers)

**External Data**

This is the data that is obtained from outside an organisation. It includes

* Taxation system (e.g. VAT)
* Data from the market

**Summary**

In this lesson, we’ve discussed that computing system is the various elements that come together to make the computer function well. We then looked at the components that constitute computing system; as People, Procedure, Data, Hardware and software.

We hope you will continue to read and solve the questions below in your own. In case you find difficulty consult this reading material first and follow all that has been discussed and you will surely be able to solve the program.

**Progress Test**

1. Explain computing system in your own words
2. Discuss the sources of data

# UNIT 1 LESSON 4

# COMPUTING SYSTEM (2)

**Introduction**

Welcome to the fourth lesson of Unit 1. In lesson 3, we looked at what a computing system is and discussed three component of a computing system. In this lesson we shall continue to discuss two extra components of a computing system namely hardware and software.

**Objectives**

By the end of the lesson you will be able to:

1. Explain role of hardware and software as components of computing system.
2. Identify two types of software
3. Explain the difference between data and information

**Definition of Information**

Information is the result of processing data into a form that can be useful to the computer user and is usually organized and understandable. (i.e. **Information** is therefore processed data). Someone information can becomes another person’s data.

**Characteristics of Information**

* **Timely:** Information must be ready when needed for correction and decision-making.
* **Precise:** It must be exact and meaningful information.
* **Relevant:** It must be necessary and important for the purpose intended.
* **Concise:** It must be short and brief for easy understanding
* **Compact:** It must be handy, bearing in mind relevance.
* **Accurate:** It must assume high level of correctness.
* **Cost effective:** It should not cost too much to obtain information.

**Source of Information**

Information can be acquired through the following means: people, news, letters, films, teaching, announcements, bulletins, magazine, books, radio, internet, news papers, music etc.

Some of the tools for sending and receiving information are: radio, TV, calculator, telephone (including mobile phones), camera, microphone, talking drums, computers etc.

**Uses of Information**

Information is needed by organisations and other individuals for many purposes and they are:

* Planning
* Recording
* Controlling
* Measuring
* Decision-making

**Hardware (physical interface)**

Hardware is the term used to define all the physical components (tangible) of the computer system. That is the part of the computer that can be seen or touched.

**Categories of computer hardware**

Basically, computer hardware can be classified under four (4) main categories.

* **Input devices** such as keyboard, mouse, scanner, digitizer, a light pen, joystick and microphone.
* **Output devices** such as monitor, printer and, speakers.
* **System Unit (Processing devices** i.e. CPU);
* **Storage devices** such as floppy and pen drive, CD, and DVD.

The inputs, outputs and backing storage units connected to the computer are referred to as **peripheral devices**. Peripheral devices are devices that are connected to and controlled by the computers CPU. Peripherals are attachments to the system unit that form the computer. Peripherals that are not controlled by or in communication with CPU are said to be OFF-LINE while those controlled by or in communication with the CPU are said to be ON-LINE.

Let us describe the categories of hardware briefly.

**Explanation of Input Devices**

They are devices or equipment that is used to send data from the external world into the computer in a form that computer understands (0s and 1s) for the purpose of processing and storing. They are the hardware that facilitates the first stage of the Information Processing Cycle (see that under how computer function). Examples of input devices are; Keyboard, Mouse, Trackball, Sensor, Scanner, Joystick, Touchpad, Biometric system, Digital camera, Light pen Web cam, Digitizing tablet, Microphone, Optical Mark reader (OMR) Optical character recognition (OCR) Magnetic Ink Character Recognition (MICR), Pointing stick, barcode reader, and the like.

**Explanation of Output Devices**

These devices translate information processed by the computer into a form that humans can understand. Thus they convey information from computer to the users.

Commonly used output devices are monitor, speaker, plotter, printer, headset, projector etc, permit the computer to communicate with you by presenting computer-prepared information in a form you can understand.

The primary kinds of output are;

**Soft Copy Output**; is data or information that is display on screens or is in audio or voice form. It exists only electrically. This kind of output is not tangible.

**Hard Copy Output**; is data or information in printed form. This kind of output can be touched

**Kinds of Output Devices**

* **Softcopy output devices**; theyare devices that present information on a displayed screen. This kind of output information cannot be touched. Examples are projectors, speakers, monitor, headset etc.
* **Hardcopy output devices**; they present information or data on a paper. Examples are printers, plotters,
* **Audio output devices**; these devices present information in a sound form. Eg are headset, headphones etc.

**Explanation of Storage Devices**

These devices hold data, information and program for a longer period until they are needed again.

Storage devices consist of two part: the **storage medium** on which information is stored such as a CD or floppy disk; **storage drive** that writes information to the medium and reads information from it.

There are two main types of storage media. These are:

* **Primary** **Storage Media**: this is the initial storage area that data and program are stored temporary before the CPU process or run them. The main example is **RAM**.
* **Secondary** **Storage Media**: these devices hold data and information permanently. Data and information on these devices can be retained after the computer has been shut down. Examples: hard disk, floppy disk, etc.

**Classification of Storage Medium;** Storage medium are classify into two,

* **Fixed Storage Medium**: this device is mostly found grounded or attached to the computer system. Example, Hard disk
* **Removable Storage Media**: these are devices that can be easily removed by the computer user without causing any damage to the device. Example: CD Rom, pen drive, memory sticks etc.

**Types of Technology that Store Information**

There are three major technology types that store information. These are **magnetic**, **optical** or **laser**, and **flash memory**. But for the purpose of our course, we will discuss the main types.

**Magnetic Storage** is any storage method in which data is written and read using different patterns of magnetization in magnetic a material to store data. The information is accessed using one or more read/write heads. Magnetic storage media, primarily hard disks, are widely used to store computer data as well as audio and video signals. Other examples of magnetic storage media are floppy disk, and zip disks

**Optical Storage** is any storage method in which data is written and read with a laser for archival or backup purposes. Typically, data is written to optical media, such as CDs and DVDs. Optical media is more durable than magnetic tape and less vulnerable to environmental conditions, on the other hand, it tends to be slower than typical hard drive speeds, and to offer lower storage capacities.

**Explanation of System Unit (Processing Unit)**

This is the core of the computer system. It is a rectangular box that houses all components of the computer system. The box can be vertical or horizontal. The vertical type of system unit is called Tower and the horizontal type of the system unit is called desktop. Power supply, Central Processing Unit (CPU), memory, hard disk, and motherboard are all housed in the system unit. All the devices that are connected to the system unit are called peripherals.

The explanation of the processing device (CPU) will be treated in detail in unit 1 lesson 8.

** Tower Desktop**



**Software (intellectual interface)**

**Some Definitions of Software**

**Software** is a computer program, which is a series of logical and sequential step of instruction that the computer follows to solve a given problem.

**Software** is the set of instructions that your hardware executes to carry out a particular task for you.

**Software** or programs are the instructions needed to direct the computer to complete specific task.

There are t**wo** major kinds of software: **system software and application software.**

* **System software**: It consists of **operating system** (which runs a computer), a **utility** (which performs maintenance or general-purpose chores), and **a language** (with which computer programs are created).
* **Application software**: Application is a computer program designed to help people perform a certain type of work. The user interacts with application software. Some people describe the application software as ‘**end-user’ software or layer software closest to the user**. Alternatively, application software consists of computer programs designed to satisfy a user’s needs. The task or problem may require, for example, word processing, that permit user to use computer to enter and save text, delete text etc. spreadsheet that allow user to create graphs for easily interpretation of information

From the discussion above, we can say that software is the set instructions controlling the computer’s operation, that permit you to apply the computer as a general-purpose too to help you in a variety if tasks.

**Activity 1**

In your own words explain the concept “software”, and mention at least three software programs not mentioned in this lesson that make today’s computer easy to use.

………………………………………………………………………………………………………………………………………………………………………………………………

**Summary**

We have learnt about software, hardware and software as components of computing system. In addition we have looked at least two types of software, and information and its’ value.

**Progress Test**

1. Computer storage media use two basic technologies in storing data – magnetic storage and optical storage. Write short note on each.
2. Discuss the two storage forms; primary and secondary
3. Explain the difference between data and information
4. Discuss three component of a computing system
5. How is the value of information determined?

# UNIT 1 LESSON 5

# CLASSIFICATION OF COMPUTER (1)

**Introduction**

Dear learner, welcome to lesson 5 of Unit 1. In lesson 4 of Unit 1, we discussed some components of a computing system, and in addition explain the role of hardware and software. In this lesson we shall discuss types of computers. We hope you are going to enjoy the lesson and perform all activities outlined.

**Objectives**

By the end of the lesson you will be able to:

1. Explain an information system
2. Classify computers by capacity.
3. Discuss the characteristics of at least three (3) computers classify by their capacity.

**Classification of Computers by Capacity/Size**

Classification in term of capacity or size is based on the system architecture which includes processing speed, the storage capacity, memory speed and cost. Although there are many types of computers, it is not easy to define them now as it was a decade or two ago. The differences between types of computers were fairly obvious.

A more appropriate distinction than size or cost is one that arises from how computers are used and the services they capable of providing. Computers can be classified into five categories. In their chronological order, they are;

* Supercomputers
* Mainframe computers
* Minicomputers
* Microcomputers (Personal computers)
* Microcontrollers (Embedded processors)

**Supercomputers**

A supercomputer is kind of computer, that has been optimized for speed and processing power. They are used for extremely calculation-intensive tasks such simulating nuclear bomb detonations, aerodynamic flows, and global weather patterns airline reservations. In such organizations, vast amount of information must be processed in short time to provide fast response to users.

It is not the size or cost that classifies a computer as a supercomputer; it is processing speed and the special ability to process numerically intensive mathematical operations quickly.

It should be noted that other factors used to categorise computers are the following: Architecture, Processing speed, Primary storage, Secondary storage, Output Speed, Number of users, Cost

**Examples** are Cyber 205, Cray X-MP, Cray 2 and Cray I (this was for several years the fastest computer in the world). Cary X-MP is five to eight times faster than Cray 1.



Supercomputer (this one is a Cray-2 from the 1980’s)

**Mainframe Computers**

The name mainframe originated after minicomputers appeared in the 1960’s to distinguish the larger systems from the smaller minicomputers.

A mainframe computer is a large, powerful computer that handles the processing for many users simultaneously (up to several hundred users) and need a very high–speed printer. Users connect to the mainframe using terminals and submit their tasks for processing by the mainframe. A terminal is a device that has a screen and keyboard for input and output, but it does not do its own processing (they are also called dumb terminals since they can’t process data on their own). The processing power of the mainframe is time-shared between all of the users. (Note that a personal computer may be used to “emulate” a dumb terminal to connect to a mainframe or minicomputer; you run a program on the PC that pretends to be a dumb terminal).

They are used in situations where a company wants the processing power and information storage in a centralized location. Mainframes are also now being used as high-capacity [server computers](http://www.unm.edu/%7Etbeach/terms/net.html#server) for networks with many client workstations

Today, mainframe is a type of computer architecture that has the ability to quickly process a high volume of data, control and use of wide range of data storage, input and output devices and support a very large number of users at one time.

The mainframe computer is used principally by large organizations such as Universities, large businesses, airlines, hospitals, government agencies and manufacturing companies and by computer service organizations such as service bureaus. These are large, powerful and **expensive** **general-purpose.** It processes **64-bit words**. They have an access time of **15 nanoseconds**.



Mainframe computer (this IBM z-series computer is about 6 feet tall)

**Examples** are IBM 360 and 370 (earliest), IBM 3084 and IBM 4381 (latest), Burroughs B7900, Amdahl 5860, Cyber 170 model and 855 and NCR 8400.

**Disadvantages of Mainframe Computers**

* They are very expensive
* Not portable
* They generate a lot of heat

**Minicomputers**

Minicomputers make up the middle class of computer size and power. They can handle large volumes of data but not like the mainframe. They are now referred to as **mid-range** servers. They are physically bigger than micros and handle **32-bit words**. The original ones were 12-bit words. Memory access time is as fast as **75 nanoseconds**. They also require a high–speed line printer and can support about 20 terminals.

**Examples include**

* IBM System 36(S/36), Advance system 400 (AS/400), DEC PDP – 8 and PDP-11 and Vax-11/780, Vax-11/750, Vax-11/782, Vax-11/730. Etc



Minicomputer systems are usually **larger** and **more powerful** than microcomputer systems and **smaller** and **less powerful** than mainframes. However, this is not always the case. **There are some micros that are more powerful than the smallest minis and large minis that are more powerful than smaller mainframes**.

Today, you will probably hear the term **departmental computer** to describe the same type of system called a minicomputer.

Once again, it is not the size, power or cost of the computer that classifies it as a minicomputer or departmental computer; rather, it is the nature of the computer’s use and the resources it can provide. These systems are often used to support business applications such as accounting, inventory control, order entry, payroll and personnel and manufacturing management. Although minicomputers do not support the extensive resources of large mainframe systems, they can easily support dozens of users.

**Micro Computers (Personal Computers)**

Personal computers usually referred to as “**PC**” are cheaper, smaller and contain less memory than mainframe systems and minicomputer. A single personal computer is generally used by only one person at a time. That certainly does not mean, however that a personal computer is less capable than its larger cousins. Personal computers are typically used at home, at school, or at a business. Popular uses for microcomputers include word processing, surfing the web, sending and receiving e-mail, spreadsheet calculations, database management, editing photographs, creating graphics, and playing music or games.

Personal computers were made possible by the development of micro-processor, an integrated electronic circuit the size of your thumbnail that contains all of the needed parts of the computer’s central processing unit.

Despite the size of personal computers – personal computers used today has greater computing speed and power than a mainframe of only en years ago. The Apple II computer launched the personal computer revolution. For the first time, a practical and somewhat cost-effective computer was available. When the Apple II became available, the only alternatives were minicomputers costing a lot or mainframe computers where users share only the computer but a cost too high. It should also be said that it is not Apple II alone that caused the computer revolution.

Personal computers come in two major varieties, desktop/tower computers and laptop computers.

**Advantages of Microcomputers**

* It is faster.
* It is durable and cheaper
* It generate less heat



Micro computer

**Microcontrollers (Embedded Processors)**

These are also called **embedded computers**. They are the tiny specialized microprocessors installed in ‘smart’ appliances and automobiles. These are some items with microcontrollers; Rice cooker, wrist watches, Microwave, conventional stoves etc.

Automobile manufactures place embedded processors in many of their new models to control climate inside the car, adjust power seats and steering wheels settings, and monitor electronic sensors that control gasoline flow, ignition spark and coolant sensors, signal and even warn drivers of road hazards.

**Summary**

All too soon we have come to the end of lesson 5 of Unit 1. In this lesson we discussed information system as a combination of people, data and procedures formed to create and distribute information throughout an institution, organisation or workplace.

We also looked at the classifications of computers by their sizes in their chronological order, namely; Super computers, Mainframe computers, Minicomputers, Microcomputers and Microcontrollers.

**Progress Test**

1. Discuss briefly supercomputers, mainframe computers and minicomputers and establish any differences existing among these computers.

# UNIT 1 LESSON 6

# CLASSIFICATION OF COMPUTER (2)

**Introduction**

Dear learner, we hope you have enjoyed all the lessons discussed so far. In lesson 5 of Unit 1, we discussed three types of computers. In this lesson we shall discuss two more, namely personal computer and embedded processors.

**Objectives**

By the end of the lesson you will be able to

1. Classify computer by their types and purpose
2. Discuss the characteristics of at least two types of computer

Can you bring to mind what we discussed about supercomputers, mainframe computer and minicomputers and their characteristics?

………………………………………………………………………………………………………………………………………………………………………………………………

**Classification of Computers by Type**

Computers represent data in different forms. Some represent data in a continuous form while others represent data in discrete form or a combination of the two. Under classification by type, (thus data representation or principle of operation) these are;

**Analogue Computers**

Is a form of computer that uses continuous physical phenomena (data using physical qualities received from continuously varying variables) such as electrical, mechanical, or hydraulic quantities to model the problem being solved. It is sometimes called special-purpose computers. The reason is that they serve a specific purpose or function only. They are mostly used in the scientific and engineering fields as a control function in quality control which are used in measuring voltage, current, temperature and pressure etc Example: thermometer, slide rule, speedometer, hydrometer etc.

**Digital Computers**

A digital system uses discrete electrical voltage levels as codes for symbols. They deal directly with numerical quantities expressed in some form of numbering system. They are mostly used in data processing environment. It has a memory that solves problems by counting, adding, subtracting, multiplying and comparing. They are also called general-purpose computers. It is design to handle many kinds of function. Example: PC, laptop etc.

**Hybrid Computers**

They are blend of both analogue and digital computers in that they can perform the function of both computers. Hybrid computers are used to obtain a very accurate but not exact 'seed' value. It has the ability to either represent data in a numerical format using binary mode or by representing data as physical quantities using varying variables. They use their analogue part to collect data and use an interface called digitizer which converts analogue signals to digital form. Example: automated teller machine (ATM), money counting machine, traffic lights, air traffic control, aircraft, calculators and the like.

**Classification of Computers by Purpose**

Depending on the flexibility and operations, computers are either general or special purpose

**Special Purpose Computers**

These are computers designed to perform one specific task or restricted a class of problems. The component and functions are uniquely adapted to a particular situation, or institution etc. In such situation, the program of instructions that the computer may follow to solve the problem is built into, or permanently stored in the machine. They are frequently referred to us “dedicated,” because of their limitations. Examples are: ATM, computers use in military operations, banks, surgical theatre and also in chemical industries etc.

**General Purpose Computers**

These computers have the capability and flexibility of dealing with variety of different problems, and are able to act in response to programs created to meet different needs. A general purpose computer is one that has the ability to store different programs of instruction. Processing on data is done by changing the instruction mode (thus to perform a variety of operation). Example, personal computers.

**Summary**

### TYPE/NATURE

SPECIAL COMPUTERS

GENERAL COMPUTERS

MICRO COMPUTERS

MINI COMPUTERS

MAINFRAME COMPUTERS

**SUPER COMPUTERS**

MICROCONTROLLERS

ANALOG COMPUTERS

DIGITAL COMPUTERS

HYBRID COMPUTERS

### 

**CAPACITY/SIZE**

### TYPE/NATURE

COMPUTERS

PURPOSE

TYPE / NATURE

**Progress Test**

1. Discuss briefly classification of computers by types and purpose and establish any differences existing among these computers.

# UNIT 1 LESSON 7

# HOW COMPUTERS FUNCTION

**Introduction**

Dear learner, welcome to lesson 7 of Unit 1. In this lesson we shall look at how the computer functions. We believe you have an idea about how computer functions and therefore will contribute as we move along.

**Objectives**

By the end of the lesson you will be able to;

1. Explain information processing cycle
2. Explain data representation in computer
3. Explain forms of computer storage

**Activity 1**

With experiences gained from the first six lessons of Unit one, how would you explain components of computer hardware?

………………………………………………………………………………………………………………………………………………………………………………………………

We believe your explanation came up with some of the issues explained below.

**Components of Computer Hardware**

Computer system consists of a central processing unit (CPU), input devices, storage devices and output devices.

A computer, regardless of its size and computing function, solves problems by accepting data, performing certain operations on those data and presenting the results of those operations. Its operations are guided by instructions in the form of program writing by a person who identified an activity that would benefit from the application of a computer task.

**How Computers Function (Information Processing Cycle)**

Before processing can occur, the data must get into the system by means of input device. The computer performs the necessary calculations of manipulations on the data; finally the organised information is displaced by the output device. Therefore, data follow through the system according to the following steps; **input**, **processing**, **output** and **storage**.

Storage Stage

(Storing information)

Processing Stage

(Data manipulation)

Output Stage

(Displaying information)

Input Stage

(Receiving data)

(The flow of a computing operation begins with data being input to the computer, the computer then processes the data – transforms it into information that is output which can be stored on a storage medium).

In some books the information processing cycle comprises with five stages, with distribution stage being the last stage of the processing cycle. But for the purpose of this course we will deal with four stages. Your course tutor will further explain the distribution stage together with devices that help in distributing information. Let take a good look at the four stages.

**Input Stage (receiving data)**

This is the first stage in the information processing. Where data is entered or captured electronically. The captured data is converted to a form that can be processed by the computer.

Examples of input hardware are: keyboard (QWERTY and DVORAK), scanner, joystick mouse microphone, and the like. An input can be sound, image, symbols, letters, numbers, shapes etc.

**Processing Stage (data manipulation)**

This is the stage where data is manipulated or processed by the micro-processor or the central processing unit to become meaningful information. Data goes through some manipulation processes such recording, sorting, classifying, calculation, editing etc. The processing device is the **CPU;** examples of CPU or microprocessors are Pentium, Celeron, AMD, and MC68010.

**Output Stage (displaying result as information)**

At this stage the information or result obtained from the data is displayed in a form usable by people. At this an output can therefore be said as information.

Examples of output devices are: speakers, printers, monitors etc. (refer more in unit one lesson 4 under components of computer hardware).

**Storage Stage (storing information)**

After displaying the information on the monitor or hard copy from printer, it can be stored for future use or reference. This stage is important if you don’t want to repeat stage 1&2 any time you deal with a particular data. The arrows in the diagram, pointing to storage stage and processing stage are bidirectional. Which simply means, information on a storage medium can be processed directly and give output, without necessarily passing through the first stage.

Example of storage media: Floppy disks, compact disc, flash drive, hard disk etc.

**Distribution Stage (information are shared)**

The last stage of the information processing cycle involves the distribution of the information created. This stage is mostly facilitated by human using some of the basic ICT tools such as telephone, electronic mail, fax machine etc. sometime the distribution information is used by other people as data input for other processing.

Although computers have many applications, they can perform only **three basic tasks**.

* Arithmetic functions on numeric data (adding, subtracting, multiplying and dividing)
* Testing of relationships between data and items (by comparing values)
* Storage and retrieval of data

These tasks accomplish really no more than people can, but the computer can do the task faster, more accurately and more reliable that the average person. A computer can solve complex mathematical problems in fractions of a second, work with the greatest accuracy imaginable and store great volumes of data. A disparity of performance between a computer and a person would be readily evident if the task, for example, involved the multiplication of two-thirty-digit number.

###### Data Representation in the Computer

As we know already, computers manipulate data to produce information. In this section we shall find out how data are represented in the computer, which also means how the computer “understands” data. Computer is an electronic device and for that matter uses electricity. Which can be either on (1s) or off (0s), this makes information to be handled in the computer by devices such as transistors, integrated circuits, semiconductors and cables, all of which can only indicate two states or conditions. Transistors are conducting or non-conducting; magnetic materials are either magnetized or non-magnetized in one direction or in the opposite direction; a pulse or voltage is present or absent. All data is represented within the computer by the presence or absence of these various signals.

In a two state on /off arrangement, one state can represent a 1 digit whereas the other as 0 digit. **Therefore, the basic number system used by the computer is the binary system (Bi-means “two”)**. This two-state situation allows computers to use the binary system to represent data and programs. In the binary system, each 0 and 1 is called a **bit**, the smallest storage unit of information in computer system. A bit is a unit data in binary system that can take a value of **1** (on) or **0** (off). Thus, in the computer the 0 can be represented by the electrical current off (or at low voltage) and programs that go into the computer are represented in terms of these numbers. Bits can be grouped in various combinations to represent characters of data such as numbers, letters, and punctuation marks. For the computer, numbers, alphabetic characters and special symbols must be reduced to representations by 1s (on) and 0s (off) called binary numbers or machine language, their reliance upon a language comprised of only binary digits 0 and 1, these systems are called digital computers.

A group of eight bits **(00000000)** represent one natural language character and is called **a byte. Information or data stored in computer system are expressed in number of bytes,** and character is usually represented by 1 byte. For example the letter H is a translation of the electronic signal 01001000, or off-on-off-off-on-off-off-off or no-yes-no-no-yes-no-no-no. When you press the key for H on the computer keyboard, the character is automatically converted into the series of electronic impulses that the computer recognizes.

**Binary Coding System**

The two popular coding scheme system, use to transform standard character sets consist of letters and numbers into their binary equivalents are:

* **EBCDIC** (**E**xtended **B**inary **C**oded **D**ecimal **I**nterchange **C**ode). Commonly used in IBM machine. Pronounced eb-see-dick and it’s used primarily for large computers
* **ASCII** (**A**merican **S**tandard **C**ode for **I**nformation **I**nterchange). Pronounced as-key, this is the most widely used binary code for microcomputers and mid-range server. It represents each character with eight bits in the computer’s memory before process.

The ASCII and EBCDIC coding schemes are sufficient for English and Western European languages but are not large enough for Asian and other languages that use different alphabets. Unicode is coding scheme capable of representing all the world’s current languages.

Let us try our hands on how to convert decimal digit to binary digit vice versa.

**Conversion from Decimal to Binary**

Conversion from decimal to its equivalent binary is called **straight binary code** e.g.54=00110110

In this conversion the most common format that we are familiar with is the continuous division of the decimal by two (which is the base). Example 54 to base two will be done this way.

|  |  |  |
| --- | --- | --- |
| Base | Decimal | Remainder |
| 2 | 54 |  |
| 2 | 27 | 0 |
| 2 | 13 | 1 |
| 2 | 6 | 1 |
| 2 | 3 | 0 |
| 2 | 1 | 1 |
| 2 | 0 | 1 |
| 2 | 0 | 0 |

Taken your answer from the bottom of the table we have 00110110.

There is also another simple format that we can apply here to convert decimal number to binary and that is using the exponential values of the base in question. in this case we are dealing with base two, so we are going to start from 20 to 27 and then consider only the numbers that add up to 54. You seem to be confused, let’s try something out.

5410to base 2.

27 26 25 24 23 22 21 20

168 64 32 16 8 4 2 1

0 0 1 1 0 1 1 0

We are dealing with 54 therefore we consider numbers that add up to 54 and all the remaining digits are considered to be zero (0).

We have 32,16,4 and 2 adding up to 54.

32+16+4+2=54. You can see that these digits are underlined and assigned the values 1 and the remaining are given zeros. Therefore writing from the left 54 to base 2 equals 00110110. You can try more examples.

**Conversion from Binary to Decimal**

We have converted 54 from decimal to binary, lets now try to reconvert from the binary state to decimal.

00110101102 to base10= 07 06 15 14 03 12 11 00

(0\*27) + (0 \* 26) + ( 1\* 25) + (1 \* 24) + (0 \* 23) + ( 1 \* 22) + (1 \* 21)+(0 \* 20)

(0\*128) + (0\*64) + (1\*32) + (1\*16) + (0\*8) + (1\*4) + (1\*2) + (0\*0)

0 + 0 + 32 + 16 + 0 + 4 + 2 + 0

=5410

**Steps**

**First**: consider the place value for each binary digit.

**Second**: use the place values as exponential values for the base (BASE 2) and multiply by the binary digit.

**NB//**: Please use asterisk sign (\*) as multiplication in ICT, never use the times symbol (x).

**Third**: sum the results to get your final answer.

**NB//**: please do not skip any of the procedure given in the example above.

**Forms of Computer Storage**

Bits and bytes are the building blocks of data .Bits are important in computing because semiconductor and other memory media are more suited to data storage in binary form. At the level of machine language, data are stored and manipulated in bit form.

A byte is a group of bits that the computer perceives and operates on as a single unit. Bytes lengths vary according to machine model and operation system. A **computer word** is a group of bits treated as a single entity by the control unit, the registers and other part of the CPU. Depending on the machine model they may be 8, 16, 2, 32, 48, 60, or 64 bits, various number system rules facilitate translation from bites to bytes in the CPU. Translation rules called computer codes, allow the CPU to convert back and forth from characters to bits and bytes.

Generally data and information move between the routing and input/output circuits and the memories in the form of bytes. Basically 8 bits equal a byte.

Bytes are often referred to in conjunction with the unit **K** (kilo), which stands for (210 but usually rounded off to 1,000. For example 10K byes or 100 kilobytes (K or KB) equal 102,400 units of storage. Another unit of measure is the megabyte (MB) which is approximately 1,000,000 bytes. For example 100 megabytes are equal to 102,400,444 bytes of storage.

A **data word** is used to store numbers and combination of characters. On a single machine model there may be several lengths or formats for instruction and data words.

To handle the input, output and storage of data we need to define larger data structures involving characters, fields, records and database. These structure are all part of the data storage hierarchy shown below.

Bits

01

Byte

11000001

Field

ABC

Record

ABC DE FGHIJ

File

KLM NO PQRS

ABC DE FGHIJ

Data Storage Hierarchy

You have just learnt about the technical aspects about the byte, but it is perhaps easier to think about a byte in terms of characters – one byte can be considered to be one character. To store the name Edwards Adjei would require 14 bytes, one for each character in the name plus one more for the space between the first and the last name (space is a character, nit empty void to the computer).

Individual data items are stored as groups of characters (bytes) in a **field**. A name address, city, state and zip code would each be contained in five individual five data fields. Collected together these fields would be stored in a **record**. Finally all records containing similar data would be stored in a **file**. How computer goes about storage and retrieving data would be discussed later.

**Summary**

We have learned from this lesson what data goes through before we get our information (thus the information processing cycle and its’ stages). We identified the three basic task of a computer.

Again we’ve looked at how data is being represented in computers, together with the two popular binary coding systems. The last thing we discussed in this lesson was the forms of computer storage, each unit of storage in a computer (bits, bytes, characters and words) has a particular function relative to hardware, storage and transfer and programming.

**Progress Test**

1. Discuss briefly how the computer functions
2. How are data represented on a computer?
3. A character is represented on the computer as 10100000. What is this value in decimals?
4. How many bytes will the following occupy on magnetic medium like floppy disk? JACKSON EDUCATIONAL COMPLEX

# UNIT 1 LESSON 8

# PROCESSING DEVICE

**Introduction**

You are warmly welcome to lesson 8 of Unit 1. In lesson 7 we discussed about how the computer functions with specific reference in data processing and data representation. In this lesson we shall discuss the Central Processing Unit (CPU) in detail.

**Objectives**

By the end of the lesson you will be able to tell;

1. What central processing unit (CPU) is and its components
2. Functions of CPU
3. How CPU process data

**Central Processing Unit**

CPU (Central Processing Unit) often called the **Processor**, is the ‘brain’ of the computer. It is the core physical component of the computer system. It's typically a square ceramic package plugged into the motherboard, with a large heat sink on top (and often a fan on top of that heat sink). All instructions the computer will process are processed by the CPU, therefore;

* The CPU controls and coordinates the operation of the entire computer system.
* The CPU coordinates with the other hardware and software components of the computer system to execute any given operation.
* It follows the instructions of the software (programs) to manipulate data into information

The Central Processing Unit (CPU) controls the interpretation and execution of computer instructions. It is responsible for instructing the computer to carry out calculations and to transfer data between parts of the computer system.

The CPU functions by breaking down a complex task into a number of discrete, simple steps. Each step is governed by a programme **Instruction**. Instruction is a coded program step up that tells the computer what to do for a single operation in a program. The instructions that form a program are stored in specific locations in main memory. These instructions are then brought into the CPU and executed sequentially. An instruction consists of an **operation**. **Operation** is the action specified by a single computer instruction, executed at machine level. **Operation** tells the CPU which function to perform, and an **operand** which defines the operation in more detail. Some examples of operation include transferring the contents of one memory location into the CPU, relocating the data from one memory location to a new memory location, increasing the value of a number in a memory by one or storing the sum of two numbers in a particular memory location.

Some of the processor types are Pentium I, II, III, IV, M, Celeron M, Dual Core and many more. They can either be in the form of Pin Grid Array (PGA) or the Slot Type (SCC).

**Component of CPU**

The CPU consists of three (3) main parts. They are

* Control Unit (CU),
* Arithmetic and Logic Unit (ALU) and the
* Register.

Each of these devices has a specific purpose in enabling the computer to carry bout its functions. Let study each of them.

**Functions of the components of CPU**

* **The** **control** **Unit** (CU); directs electric signals between main memory (RAM) - which temporarily holds data, instructions, and processed information and ALU. It also directs instructions between main memory and output/input devices. It interprets each instruction issued by a program and then initiates the appropriate action to carry out the instruction. It directs and controls all the activities in the system. In other word, it tells the rest of the computer system how to carry out a program’s instruction. The control unit has two responsibilities i.e., instruction interpretation and instruction sequencing.

In instruction interpretation the control unit reads instruction form the memory and recognizes the instruction type, gets the necessary operand and sends them to the appropriated functional unit (input unit, output unit, memory, ALU). The signals necessary to perform desired operation are taken to the processing unit and results obtained are sent to the specified destination.

In instruction sequencing control unit determines the address of the next instruction to be executed and loads it into program counter.

* **Arithmetic** **and** **Logic** **Unit** (**ALU**); performs arithmetic, comparison, and logical operations. The **arithmetic operations** are the fundamental math operations. As you might guess, arithmetic operations are the fundamental math’s operations: addition (+), subtraction (-), multiplication (x), and division (÷). **Comparison operations** involve, comparing two piece of data to seen whether one is equal to (=), greater than (>), etc.**Logical operations** use conditions along with logical operators such as **AND**, **OR**, and **NOT.**
* **Register**-- They are high speed areas that temporarily store data during processing. They hold data, keep track of instructions, and hold the locations and results of these operations. They hold materials that are to be processed immediately. The control unit for instance fetches an instruction from memory and places it in a decoding register before determining its purpose. The computer loads the program instructions and data from main memory into the register just prior to processing, which helps the computer process fast.

**Internal Work of the CPU**

The machine cycle of the **CPU** repeats a set of four basic operations:

* **Fetching** is the process of obtaining program’s binary code, instruction or data item from its temporary location in RAM and move to the CPU.
* **Decoding** is the process of translating the program’s binary code instruction into commands the CPU understand and can execute.
* **Executing** is the process of carrying out the commands. The ALU performs the calculations
* **Storing** is the process of saving the result in the registers.

**The flow of data, instructions and information in the CPU**

**CPU**

Input Device

Output Device

Control Unit

Main Memory Unit

ALU

**CPU**

Earlier, the CPU was described as having four functions, fetching, decoding, executing and storing. These functions, are carried out in that sequence during what is called a **machine cycle**. The machine cycle consists of two parts. The first part is the **instruction cycle, or instruction time (i – time)** is the time it takes the control unit to fetch and decode an instruction that is retrieving it from an address in the computer’s main memory and determining what task the instruction requires. The second part of t he cycle is called **execution cycle or execution time (e- time)**,is the time it takes control unit to execute (actually operation carried out) and the new data resulting from the operation are stored in memory. (Refer to diagram in machine cycle).

**Instruction cycle**

* Fetch instruction
* Decode instruction

**Execution cycle**

Stores data

Execute instruction

Retrieve data

Buffers are also temporary data-holding areas built either in the CPU or into input or output devices. No matter how fast your disk or printer may appear to be, it is much slower than the CPU, so data being sent to or from input/output devices are placed by the CPU into buffers so that the slower devices do not hold back efficient processing.

The speed at which the computer is able to complete the machine cycle is considered one measurement of the computer’s performance. You can compute the total time required for a machine cycle by adding together the i-time and e-time. Some of computer professionals measure a CPU’s speed according to how many **millions of instruction per second (**MIPS**)** it can process.

The speed at which the computer is able to complete the machine cycle depends on three characteristics; the system clock, bus width and word size. Earliest computer models performed operations at a rate of 4.77 megahertz. Basically the speed of computers are measured in **hertz**.

**Clock unit or system clock** it dictates how fast the CPU operates. Today’s personal computers work at 16 to 33 megahertz. ***Megahertz***, which is translated as millions of cycles per second, is simply the measurement of how fast the computer is able to turn a circuit on and off. Ability to complete a machine cycle is governed by the more than just the system clock rate. Depending on t he nature of instruction and on design of the computer’s bus width and word size, more than one cycle, may be needed to complete a single machine operation. Therefore the speed of the system clock alone is not necessary a good measurement of system performance.

**Bus**

A bus is a common electrical pathway between the various components of the computer. The bus connects all parts of the CPU and the input and output devices as well. Think of the bus as a road. A narrow, single-lane road permits limited, one-way traffic, whereas a superhighway has the capacity for many vehicles at one time, going in different directions. The concept applies fairly well to the computer.

Earlier personal computers used an 8-bit data bus design. The design limited data to one traffic and only one bit at a time could be transmitted. As processor capacity developed, newer buses with 16-bit or 32-bit paths were introduced. The latest developments in bus design include multidirectional data buses. These bus designs permits faster data flow because they permit multiple operations to be completed, such as sending output to the printer while taking in keyboard input.

**Word size**

A computer word is the number of adjacent bits that can be stored and manipulated as a unit. Some of the newer computers manipulate a 32-bit word whereas older models have word length of 8 to 16 bits. Word lengths range up to 128 bits for supercomputers.

If you really want to determine a computer’s relative performance, you should look at **throughout**, the computer’s ability to start and end a complete task. It is advisable to always test on some more relevant factor that you can understand; for example, how long does it take the computer to calculate and output a financial analysis from a spreadsheet program.

**Summary**

Dear learner, how did you find this lesson? Indeed, very interesting and computers are really powerful. We have looked at the processing device in detailed, the major constitute of the microprocessor, how the CPU process data with specific reference to instruction cycle and execution cycle. We also discussed the speed at which the computer is able to complete the machine cycle.

**Progress Test**

1. Describe the two parts of machine cycle
2. Define and differentiate register and buffers
3. Describe a computer bus; how does it affect computer processing?
4. Explain the machine cycle as used by the CPU as clearly as you can

# UNIT 1 LESSON 9

# MEMORY

**Introduction**

We welcome you to another lesson. In the previous lesson, we examined central processing unit (CPU). In this lesson we shall look at the memory and storage their functions.

**Objectives**

By the end of the lesson you will be able to:

1. Identify the main types of memory
2. Discuss the characteristic of the type of memory.

**Activity 1**

We believe you can mention the components of a CPU

………………………………………………………………………………………………………………………………………………………………………………………………

**The Main Memory/Primary Memory/ Primary Storage**

You may not know that most of the electronic items you use every day have some form of memory. Here are just a few examples of the many items that use memory:

* Cell phones
* Game consoles
* Car radios
* VCRs
* TVs

Each of these devices uses different types of memory in different way!

The memory is the most important component next to the CPU

During processing, the processor places instructions to be executed and data needed by those instructions into memory. This **memory is a temporary storage place for data, instructions, and information**.The main memory is the collection of slots each of which can store one byte of instruction or data. Each byte of memory has numeric labels for its location called **address**. The user memory in most personal computers (PC) is limited to the address from 00000-9fffff that is six hundred and forty (640) kilobytes (KB). This limitation is placed by the operating system. The operating system is a program, which manages the hardware, software and information efficiently, (we’ll discuss it in our next lesson). Memory stores three basic items:

* The **operating system** and other software that control the usage of the computer equipment.
* **Application programs** that carry out a specific task such as word processing ,and
* The **data** being processed by the application programs.

A byte (character) is the basic storage, unit in memory as well as all storage devices. When application program instructions and data transfer into memory from storage devices, the instructions and data exist as bytes. Each byte resides temporarily in a location in memory called an **address**. An **address is the unique number that identifies the location of byte in memory**. For instance, seats in state transport such as VIP are similar to addresses in memory: (1) a seat holds one person at a time and an address in memory holds a single byte, (2) both a seat and an address can be empty, and (3) a seat has a unique identifying numbers and so does a memory address. To access data or instructions in memory, the computer references the addresses that contain bytes of data.

Manufacturers’ state memory and storage sizes in terms of the number of bytes the device has available for storage. A **kilobyte** of memory, abbreviated **KB** or **K**, is equal to exactly 1,024 bytes. To make memory and storage definitions easier to identify, computer users often round a kilobyte down to 1,000 bytes. For example, if a memory chip can store 100 KB, it can hold approximately 100,000 bytes (characters). A **megabyte (MB)** is equal to approximately one million bytes. A **gigabyte (GB)** equals approximately one billion bytes.

**Other Features of the Main Memory**

1. **Electronic**: Its operations are wholly electronics and consequently very fast and reliable. It is made up of semi- conductor storage, which consists of very small circuit (is a path through which electronic current passes).
2. **Immediate access**: Data is almost naturally accessible from the main memory because of its electronic operation. Data is also retrieved from main storage in much lesser time.
3. **Locations**: It contains several compartments called locations. Each location has a unique address.

The process of entering data into storage is called **writing**. When data is/are placed in, or written to storage, they replace what was originally there. The process of retrieving data from storage is **reading**. Reading does not change the data in any way.

**Types of Memory**

The system unit contains two type of memory;

* **RAM** (Random Access Memory)
* **ROM** (Read Only Memory)

**Random Access Memory (RAM)**

It often referred to as the main memory, primary memory, or internal memory. It is the temporary storage area for data, instructions, programs, and information for the processors during execution of instruction. It consists of memory chips that can be read from and written to by the processor and other devices. Data contained in RAM is held there temporally until it is no longer needed or the computer is turned off. When the computer is powered on, certain operating system files (such as the files that determine how your windows desktop displays) load from a storage device such as a hard disk into RAM. These files remain in the RAM as long as the computer is running. As additional programs and data are requested, they also load from storage into RAM. RAM takes its name from the fact that it allows data to be accessed randomly by the CPU. The processor interprets the data while it is in RAM. During this time, the contents of RAM may change. RAM can hold multiple programs simultaneously, provided the computer has enough RAM to accommodate all the programs. The program with which you are working usually displays on the screen. The amount of RAM on the computer determines the amount of programs and data a computer can handle at one time, which affects overall performance. The more RAM, the faster the computer will respond. The more primary storage available means that more instructions and data can be loaded into the computer. Many applications require specific amount of memory, else application package cannot be used. Most computers have provisions for adding individual RAM chips to the main circuit board or adding RAM though expansion cards.

**NB**// too much of everything has its own disadvantages.

Two basic types of RAM chips exist: dynamic RAM chips (DRAM) and static RAM chips (SRAM).

Sample of RAM chips



**Characteristics of** Random Access Memory **(RAM)**

1. The RAM can hold data and programs that can be written into its storage area.
2. New data and programs statement can overwrite existing ones or items.
3. It is volatile because data and programs held in it can be lost when power is switched off. This is due to the fact that data is stored using electrical signals.
4. RAM is measured in bytes. Some typical RAM capacities are

Kb (kilobyte): 210 or 1024 bytes approximated to 1000.

Mb (Gigabytes): 1 million bytes.

Gb (Gigabyte): 1 billion bytes.

**Significance of the RAM**

Data and programs are held in RAM before processing can be done. The program and data should be of a size that the RAM can contain. (It is important to note that the application to be used and the operating system depend on the RAM size). If the size of the RAM is not enough to accommodate the operating system and still have enough space to hold other software and data, then the purpose of purchasing a computer system will not be achieved.

**Uses of the Main Memory**

It is used to store data requiring processing in other to achieve maximum processing speed. It therefore stores:

1. Instructions waiting to be obeyed.
2. Instructions currently being obeyed.
3. Data waiting processing.
4. Data currently being processed.
5. Data awaiting output.

**Some Basic Terminologies on Memory Capacity**

How many 0’s and 1’s will a computer’s main memory or a storage device such as a hard disk hold? The following terms are used to denote capacity:

1. **Bit**: It is a binary digit (0 or 1). It is the smallest unit of measurement.
2. **Nibble**: It is half a byte. In other words, it is a group of 4 bits.
3. **Byte**: A group of 8 bits is called a byte, and a byte represents one **character**, digit, or other value. The capacity of computer’s memory or a diskette is expressed in numbers of bytes or generally in multiple of bytes.
4. **Kilobyte**: A kilobyte (K, KB) is about 1000 bytes. (Actually, it’s precisely 210 = 1024 bytes but the figure is commonly rounded).
5. **Megabyte**: A megabyte (M, MB) is about 1 million (106) bytes (i.e. 220 = 1 048 576 bytes).
6. **Gigabyte**: A gigabyte (G, GB) is about 1 billion (109) bytes (i.e. 230= 1 073 741 824 bytes).
7. **Terabyte**: A gigabyte (T, TB) represents about 1 trillion (1012) bytes (i.e. 240 = 1,009,511,627,776 bytes).
8. **Petabyte**: A new measurement accommodates the huge storage capacities of modern databases a petabyte represents about million gigabytes (1015) bytes or (106) gigabytes (i.e. 250 = 1, 125,899, 906, 844,624).
9. **Word**: A computer **word** is the number of bits that make up a unit of data as defined by the computer system. Common word length is usually related to the capacity of the **computer’s bus or bus lines**. Examples of word sizes are 8 bits word, 16 bits word, 32 bits word, and 64 bits word.

**Read Only Memory (ROM)**

It is an integrated circuit programmed with specific data at the time of manufacture that start up the computer. That is, memory chips storing data that only can be read. ROM chips contain data, instructions, or information that is recorded permanently. For example, ROM contains the **basic input/output system (BIOS)**, which is a sequence of instructions the computer follows to load the operating system, checks other hardware connected to the system unit (keyboard, screen (monitor) disk drives and so on) and other files when you first turn on the computer..ROM chips are also use in many gadgets. For example, ROM chips in many printers contain data for font.

Manufacturers of ROM chips often record the data, instructions, or information on the chips when they manufacture the chip. These ROM chips, called **firmware,** contain permanently written data, instruction, or information. The BIOS is firmware that contains the computer’s start-up instructions. The instructions stored in the ROM chip are “hard wired”.

**Characteristics of the Read Only Memory (ROM)**

* It contains items, which have been permanently written into it. A specific function has been burnt into the chip at a time of manufacture.
* It is non-volatile. It does not lose its data even when the computer is switched off. Because of this, it is used for permanent purposes such as control function. The contents of ROM are for system use and as such not accessible to the user. ROM can be found on the mother board and it contains the BIOS (Basic Input Output System) software.

**Variations of ROM chips** are;

* Programmable Read-Only Memory (**PROM**)
* Erasable Programmable Read-Only Memory (**EPROM**)
* Electrically Erasable Programmable Read-Only Memory (**EEPROM**)
* **Flash Memory**, also known as **flash ROM** or **flash RAM**. Many current computer uses flash BIOS. With flash BIOS, the computer easily can update the contents of the BIOS chip, if necessary. Flash memory chip store data and programs on many handle devices such as cellular telephone, printers, digital recorders and cameras. Removable flash memory allows users to transfer data and information conveniently.
* Complementary Metal-Oxide Semiconductor Memory (**CMOS**) store configuration information about the computer. This information includes the type of disk drives, keyboard, and monitor; the current data and time; and other start-up information needed when you turn on the computer. CMOS chips use battery power to retain this information even when the power to the computer is off. Unlike standard ROM, the computer can change information in CMOS, such as when you change from standard time to daylight saving time or when you add new hardware devices to the computer.

###### Differences between RAM and ROM

|  |  |
| --- | --- |
| **RAM** | **ROM** |
| It holds data, programs, and information temporarily for the processor during program execution | It contains fixed start-up instruction |
| It is volatile (thus, loses it’s content when the computer is turned off) | Non-volatile (content is retained even when the computer is turned off) |
| It can be read/written on by users | It can only be read |
| Cannot be found in most electrical appliances | Can be found in most appliances |

**Summary**

In this lesson we learnt that about the memory as temporary storage area for the processor during program execution. We also discussed the types of memory and its characteristics and examples each, from the discussion we have noted that both RAM and ROM generally behave as holding or storing information for the user. Lastly, we’ve learnt the differences between the types of memory.

**Progress Test**

1. What is memory?
2. What are RAM and ROM used for on the computer?
3. How do RAM and ROM behave generally.

# UNIT 1: CLOSURE

# A WORLD WITH COMPUTERS

**Introduction**

Dear all too soon we have come to the end of Unit one. We hope you enjoyed reading and solving all the problems outlined. We appreciate all your efforts and cooperation.

**Summary**

The unit generally dealt with the meaning of computer, computer literacy, computing system, computer system and how the computer functions. Again we have looked at the CPU and its components.

**End-of-Unit Exercises**

1. Explain why computer literacy is important today
2. How have personal computer affected us today?
3. Discuss the components of a computing system?
4. List and discuss typical hardware components?
5. Discuss briefly how the CPU process data.

# UNIT 2

# SOFTWARE AND ITS APPLICATION

**Introduction**

Dear learner, we welcome you to Unit 2 of this course which deals with software and applications. Like Unit one, we shall be discussing interesting issues. We believe you will relax and enjoy studying this unit.

**Objectives**

By the end of this unit you will be able to:

1. Tell about system software and application software
2. Discuss the operating system and what it does
3. Identify user interface
4. List and discuss types of application software
5. Discuss communication and network

# UNIT 2 LESSON 1

# SYSTEM SOFTWARE

**Introduction**

Dear learner, you are welcome to the first lesson of Unit 2. In this lesson we shall discuss system software and operating systems. Please take good note of all the objectives outlined and find out if you have achieved them by the end of the lesson.

**Objectives**

By the end of the lesson, you will be able to:

1. Identify types of software
2. What system software is
3. Explain what operating system is

**Software**

Software consists of the instructions that tell the computer how to perform a task or what to do. Software is written in special code by programmers. In most instances, the word software and program are interchangeable. Software is divided in two:

1. System software
2. Application software

**System Software**

Programs that control and direct the operation of computer hardware are system software. System software controls the allocation and usage of hardware and other resources and enables application software to run. It is the software that the computer uses to manage its own internal activities. System software acts as the interpreter that allows you and your application software to access the physical hardware devices and other resources.

Hardware

System software

Application software

User

(A computer interacts with both the system software and application software to accomplish a task)

System software is not a single program. Rather it is a collection or a system of programs that handle hundreds of technical details with little or no user intervention. System software consists of four types of programs:

* **Operating systems** are programs that coordinate computer resource, provide a user interface, and run application. (we’ll discuss it in detail later)
* **Utilities**, also known as **service programs**, perform specific tasks related to managing computer resources. They are use to perform task like Backup, Data recovery, file defragmentation, Disk repair, Virus protection, data completion

**Examples of utility programs are:**

**Antivirus**: They are programs that guard your computer system against viruses and other damaging programs that can invade the computer system.

**Backup programs**: Programs that make copies of files to be used in case the originals are lost or damaged.

**File compression programs**: Are programs that reduce the size of files so they requires less storage space and can be sent easily via the internet e.g., WinZip, Winrar

**Uninstall program**: Program that allow you to safely and completely remove unneeded programs and files from your hard disk.

* **Device drivers** are specialized programs designed to allow particular input or output devices to communicate with the rest of the computer system. It helps the computer to control peripheral devices.
* **Language translators** convert the programming instructions written by programmers into a language that computer understand and process.

**Operating System**

It is collections of programs and instructions that controls and coordinate the operations of the computer system (the hardware and software components.).

An **operating system** or **OS**, is a software program that enables the computer [hardware](http://www.computerhope.com/jargon/h/hardware.htm) to communicate and operate with the computer software. Without a computer operating system, a computer and [software](http://www.computerhope.com/jargon/s/software.htm) programs would be useless.

Is a set of programs that controls and supervises a computer system’s hardware and manages the application software. It is the foundation on which other application programs word, excel and access run. It controls the application software and manages how hardware devices work together.

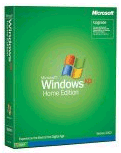
The operating system acts as the master control program that runs the computer. It helps the computer to control the peripheral devices.

An operating system is a set of programs that controls and supervises a computer system’s hardware.

Its purpose is to manage the hardware for the most efficient use of computer resources and to provide an interface between a user application programme and the hardware. The operating system dramatically increased the efficiency of the CPU. By providing a standard set of instructions for commonly used hardware functions, it took the burden of programming every detail of an operation of the programmer.

While the computer is running, the operating system resides in the computer’s memory, so the details of an operating are received and executed by the computer at computer speeds.

Examples of Operating System are MS-DOS, Microsoft windows: (95, 98, CE, ME, XP, NT, Vista), UNIX OS: (BSD UNIX, System V), Macintosh OS (MacOS) and Linux OS: ( Mandriva, Ubuntu, Red Hat, Caldera, Debian, and openSuse ).



Example of [Microsoft](http://www.computerhope.com/comp/msoft.htm) [Windows XP](http://www.computerhope.com/jargon/x/xp.htm),

**Functions of Operating System**

Every operating system performs a variety of functions.

* **File management**: Coping or duplicating files from one disk to another. Keeps track of physical location of files on magnetic disk or other secondary storage devices.
* **Formatting or Initialisation**: Formatting a disk is a process of preparing a disk so that it can store data or programs.
* **Task management**: example is: 1. multitasking that is one user executing more than one program simultaneously or at the same time. 2. Multiprocessing that is one or multiple users simultaneously processing two or more programs by multiple computers.
* **Managing computer resources**: These programs coordinate all the computer’s resources including memory, processing, storage, and devices such as printers and monitors (it allows the efficient control and use of input and output devices. This is done by DOS. They also monitor system performance, schedule jobs, provide security (maintain security by checking ID’s and passwords etc), and start up the computer.
* **User interface**: users interact with application programs and computer hardware through a user interface. (further explained later )

**Other functions**

* Providing error messages
* **Booting**; is the process of loading the Operating System into the computer’s memory. In other words, is the process of switching on the computer and starting the operating system. Or It is the process of starting or resetting a computer. A booting can be **cold** or **warm.**

**Cold Boot or Hard reboot** - is start up process that begins with turning on the computer's power by flipping the power switch. Typically, a cold boot involves some basic hardware checking by the system followed by loading of the operating system from disk into memory.

Cold booting prolongs the life of the computer and secures your data from being damaged.

**Warm Boot (Reboot) or Soft reboot** - is a process of restarting the computer that does not involve turning on the power and waiting for the computer to check itself and its devices or restarting a computer under software control.

**Reason for Warm Booting/Rebooting**

* For effective operation of newly installed software program. For instance, installation of antivirus programs, Nero program and the like.
* Another reason that encourages warm booting is when peripheral device is attached to the computer.
* When the computer freezes, it needs to be rebooted. Freezing is the state where all computer operations cease although the computer is on.

**Method of Rebooting**

There are three main method involved in rebooting of a computer. These are;

* Using the reboot tab; to use the reboot tab, one need to go through these steps;
* Click on the **Start button** on the windows task bar (the row at the bottom on the windows screen where all currently open applications or files are listed) to display the start menu.
* Click on the **Turn off** computer button.
* Finally, click on **Restart button** for the system to do the rebooting
* Using CTRL, ALT, and DEL buttons simultaneously; the combination of these keys allow soft reboot
* Using the reset button; this is done by pressing the reset button in front of the system unit.

**Summary**

We hope you have enjoyed reading this lesson. In this lesson we discussed system software and operating system. The computer’s value is in our ability to put it to work for us in solving problems and producing information as we need it and under our control.

**Progress Test**

1. Discuss briefly system software and operating system
2. Discuss how computer interacts with both the system software and application software to accomplish a task.
3. What are the functions of operating system?
4. Mention two additional examples of operating system, that were not mention in this lesson?

# UNIT 2 LESSON 2

# CATEGORIES OF OPERATING SYSTEM

**Introduction**

Dear learner, welcome to lesson 2 of Unit 2. In the previous lesson we discussed system software and operating system. In this lesson we shall look at the categories of operating system and the importance of operating system.

Try and answer the question below.

**Activity 1**

What is operating system? Give examples.

………………………………………………………………………………………………………………………………………………………………………………………………

………………………………………………………………………………………………

**Objectives**

By the end of the lesson, you will be able to:

1. Identify two categories of operating system
2. Discuss what an operating system does

**Categories of Operating System**

There are hundreds of different operating systems, there are only three basic categories: embedded, network, and stand – alone / desktop.

**Embedded Operating Systems** are used for handheld computers and smaller devices like PDAs. The entire operating system is stored permanently on the ROM chips within the device. Popular embedded operating system includes; Windows CE and Palm OS.

**Network Operating System:** This is a kind of operating system which is built to control and coordinate communication in computers that are networked or linked together, and mostly it is installed on network servers. Servers are centralized device in a network which helps all other computers to communicate with each other. Examples are; Windows NT, Windows server 2000, 2003 and 2008.

**Stand-alone Operating System / Desktop Operating System:** These are built to support mini and micro computers which are mostly used in our homes and offices. They help users to run application and also control the system hardware. Examples of this operating system are; Ms disk Operating System, windows XP, 98, 2000, Linux, UNIX, Mac OS etc.

Most operating systems are **proprietary operating system**; that is they are owned and licensed by a corporation. The Window operating system is a proprietary operating system owned by the **Microsoft Corporation**. Some individuals and organizations have developed **non- proprietary operating system** in which the operating system program or source code is provided to outside individuals. These individuals are encouraged to use, improve, and modify the programs. Program released in this way are called open source. Example is Linux; ( Mandriva, Ubuntu, Red Hat, Caldera, Debian, and openSuse)

**What an operating system does when the computer is turned on.**

When a computer is turned on a small program, called the BIOS (Basic Input /Output system) located in Read-Only Memory (ROM) (BIOS is a set of instruction stored on ROM chip that interfaces the major hardware components of the computer with operating system. This makes the BIOS neither pure hardware nor software. Is more accurately called **firmware** or software inscribe in hardware) is run. The BIOS runs the POST (Power-On-Self - Test), which check or manages the CPU, memory, disk drives, keyboard, monitor, ports and various other devices are functioning correctly, and then runs the bootstrap program. The computer *power-on self-test (POST)* tests the computer to make sure it meets the necessary system requirements and that all hardware is working properly before starting the remainder of the boot process. If the computer passes the POST the computer will have a single beep (*with some computer BIOS manufacturers it may beep twice*) as the computer starts and the computer will continue to start normally. However, if the computer fails the POST, the computer will either not beep at all or will generate a beep code, which tells the user the source of the problem

The bootstrap program is responsible for loading the actual operating system form the hard disk into memory. The bootstrap program passes control to the operating system once it is loaded. The operating system will read configuration files, which set up the rules by which the operating will run, and start any software that needs to be loaded. Once fully awake, the system signals you that it is ready to go to work. That signal is what we call the **prompt.** The operating system will present the user with some way of interacting with the system.

Some part of the operating system is automatically loaded into the RAM soon after you **turn on**, or “**boot”** the computer. The parts of the operating system that always remain in memory while the computer is on are called “**resident**”. Less-frequently-used parts of the operating system are copied from disk when needed and are called “**non-resident**” or “**transient**”.

**The Role of the Operating System**

* It provides graphical user interface for the user to interact and communicate with the computer.
* It manages the computer system’s hardware and peripheral devices.
* It manages the processor, or central processing Unit.
* It manages and maintains the disk file systems.
* It supports other application programs.
* It provides a consistent means for software applications to work with the CPU.
* It tracks errors and report faults to the user.
* It controls transfer of data to the storage devices from the computer’s memory.
* It helps other peripheral devices to communicate with the computer.
* It helps the computer to boot and after booting it loads and keeps other programs that the computer needs to run in memory.

**Summary**

Dear learner, in this lesson we have discussed the categories of operating system. We have also looked at what operating system does when the computer is turn on.

**Progress Test**

1. In 5 unique sentences, state the specific role performed by the Operating System
2. Explain what an operating system does

# UNIT 2 LESSON 3

# OPERATING SYSTEM (USER INTERFACE)

**Introduction**

Dear learner, you are warmly welcome to lesson 3 of Unit 2. We believe you enjoyed reading and solving problems on lesson 2 which looked at the two categories of operating system and what an operating system does.

In this lesson we shall discuss user-friendly systems and user interface and form.

**Objectives**

By the end of the lesson you will be able to:

1. Explain user-friendly operating system,
2. Discuss the two user interface and forms

**User-Friendly Operating System**

Many computer users have a fear that they will have to learn a somewhat baffling list of mysterious commands to use their computer. Unfortunately, a computer can be made to act in that way; the fear can be well founded id the operating system or application programs use commands and keystrokes with hidden meaning, if help is not easily available or if a program seems to defy a seemingly obvious operation.

**User-friendly** is a term that implies that the computer somehow assists you; it provides a better means by which you can communicate your needs to it and by which it can guide you when necessary. User-friendly has acquired the popular definition of “easy to learn and easy to use” but that depends on your needs, sophisticated and expectation. Usually a novice may wish more helpful and computer-aided assistance.

One way in which the operating system influences the computer’s ease of use is in the style of user interface provided.

**User Interface**

The term **user interface** is the means by which you are able to issue commands and instructions to the computer and by which the computer can inform you of actions you must take or errors in operation. Many forms of User interface exist, each with bits own sort of personality in terms of what it implies for your use of the computer.

Again **user interface**, can be also said to be the way in which t he computers operating system presents information to user and how the user gives information or instructions to the computer a swell as interacting and communicating with the computer.

**Functions**

* It helps the user to give instructions or commands to the computer.
* It helps the computer to present information to the user.
* It helps in shutting down the computer safely.

**Types of User Interface**

Basically there two major types of operating system. These are;

* **Command Line (CL) / text interface**
* **Graphic User Interface (GUI)**

**Command Line/ Text Interface**

Sometimes referred to as the **command screen**, the **command line** is a user interface that is navigated by typing commands at prompt, as opposed to using the mouse to perform a command. For example, MS-DOS (Short for **Microsoft Disk operating system**) is a command-line and is navigated by using MS-DOS commands. The root of MS-DOS command line prompt is generally **C:\>**. In MS-DOS to view folder, you would navigate to the folder using the **cd command** and then list the files in that folder using the **dir command**. A command line only uses a keyboard to navigate by entering commands and does not utilize a mouse.

Because a command line interface requires unique commands, this interface is often more difficult to learn because of the need to memorize dozens of different commands. However, a command line operating system can be a very valuable resource and should not be ignored. For example, users who have Microsoft Windows may find trivial tasks such as renaming 100+ files in a folder a very difficult task; however, this is something that can be done in a matter of seconds through a simple command at the command line. Today, MS-DOS is no longer used; however, the command shell, more commonly known as the **Windows command line** is still used by many users.

**Characteristic of Command Line/ Text interface**

* **Prompt**

A prompt is simply a program generated signal to you that lets you know the system is ready for action by you. Prompts are created by both application program and operating systems and are one of the most characteristic form of the user interface. The DOS prompt seen on most machines using the MS-DOS or PC-DOS operating systems generally looks like this: C:/>. The simple form of the user is said to be the **character based**, or **command-line oriented**, because it indicates to you that you are to respond by typing in a series of characters to issue a command to the computer.

* **Text**

It presents information to the user in the form of text. Command Line is a character based; the user need to type in special command with the keyboard to make things happen. The command line interface is not user friendly as you need to remember every word and how to use them correctly.

Example; c\>copy c\myfile a: \yourfile.

**Graphic User Interface (GUI)**

**GUI** Short for **Graphical User Interface** is expressed as combination of text, graphics and small pictures or icons arranged inside windows. It is also called WIMP systems. WIMP stands for Windows Icons Menu Pointer. The menus are activated using a pointer which is moved when using a pointing device like mouse. A GUI uses **windows**, **icons**, and **menu** to carry out commands such as opening files, deleting files, moving files, etc. and although many GUI Operating Systems are operated by using a mouse, the keyboard can also be used by using keyboard shortcuts or arrow keys.

GUI Operating Systems are much easier for end-users to learn and use because commands do not need to be known or memorized. Because of their ease of use, GUI Operating Systems have become the dominant operating system used by end-users today.

**Characteristics of Graphic User Interface (GUI)**

* **Icons;** graphical representations for a program or function screen. The use of icons to symbolise actions or options has dramatically altered the way in which we communicate with the computer. Certainly the use of icons has made learning to use the computer more intuitive. New computer users have only to become accustomed to moving the mouse and selecting the proper icon for their task in order to become productive.

**Windows;** rectangular area for displaying information and running programs. **A window** is a specifically designed area of the screen in which may be displayed data, menus, programs applications, icons and other windows. The metaphor used to explain the windowing environment is **desktop**. In this environment, you are able to arrange your work on the computer screen similar to the way you might arrange on top of your actual desk. Other tasks represented by additional windows, would appear beneath or to one side or another of the current window.

* **Menu;** provides a list of options or commands, which the user may choose the one he/she desire. A menu in the computer’s screen is an attempt to improve the user’s interface by providing a listing of commonly used commands or actions which may be selected to initiate a computing activity.

**Summary**

In this lesson we have discussed user-friendly operating system, and explain the concept user interface. We hope you have equipped yourself with all the characteristics of user interface.

**Progress Test**

1. What is the user interface?
2. Discuss briefly a DOS prompt
3. Explain the characteristic of GUI

# UNIT 2 LESSON 4

# APPLICATION SOFTWARE

**Introduction**

Dear learner, you are welcome to lesson 4 of Unit 2. In lesson 3 of Unit 2, we discussed user-friendly operating systems and user interface with its characteristics. We believe you have taken notes on all the important features and issues discussed. Good!!

In this lesson we shall discuss application software and types.

**Objectives**

By the end of the lesson, you will be able to;

1. Explain the concept application software
2. Identify packaged software as a type of application software
3. Discuss the importance of packaged software
4. Discuss user-written developed software

**Application Software**

Is special computer program that has been developed, designed or written to solve a particular problem for users to perform useful work or specific tasks.

Application software is software that has been developed to solve a particular problem or to perform a specific task, such as word processing software used to prepare documents and game software used to entertain.

Application software can be described as the end user software designed to accomplish a variety of different task. It helps the user work faster, more efficiently and thus more productively than if the job was done manually. Application software may be **custom** or **packaged**.

* **Custom software or Custom Written software (special purpose)**. Is software designed and developed for a particular customer. Custom software performs a task that could not be readily done with standard off-the-shelf packaged software available from a computer store or mail order house. **Special- purpose application** include thousand of other programs that are more narrowly focused on specific disciplines and occupations e.g. invoice production software, payroll system program, stock control program.

**User-Developed Software**

As an alternative to commercially packaged software, some users write their own. **User-written application packages** are those that are written by developers according to t he user’s specification. A user can be either an individual, such as yourself, or an organisation, such as business.

An added advantage to writing one’s own software is that the creator may, in turn, be able to market and sell it to others. What was user-written software to them quickly become prewritten software to us.

* **Packaged software or Software packaged (general purpose)**. Is the kind of off-the-shelf program developed for sale to the general public. **Generally software** is developed for a wider variety of applications and meets most of the needs encountered by the computer user. They are also known as basic application. They are widely used in nearly every discipline and occupation. Examples of packaged software that you will most likely encounter are word processing programs, spreadsheet programs and office suites.

Prewritten, packaged software has several advantages

* The packages can be set up and running quickly; they are ready for immediate use. Once ready and installed on the computer, it is ready to use.
* They are usually less expensive that those produced in – house by the user company or an individual. In – house developmental costs for software are high because development is time consuming and requires skilled personnel.
* Pre – written software has already been tested. Any new software requires a great deal of testing before it is ready to use. Commercially produced software will not be marketed successfully if the buying audience is not convinced that the software is reliable and efficient. The testing of the software package begins inside the developer’s own organization

**Shareware** (software made available for free trial with the understanding that the user will voluntarily pay a fee to the author or publisher for continuous use) is one avenue for acquiring software. A software developer owns the rights to the software but elects to distribute free of charge or for a nominal fee. **Public domain software** earns its name from the fact that the developers have given up their rights to the software, or because it was produced from public funds, such as university research project underwritten by a government grant. This software is distributed free of charge.

**Unauthorised** copying and distribution of software is illegal. It is also an unethical use of the software to which you have access. When an author creates a book, such as the one you are reading, the author can obtain a copyright, which provides legal protection against unauthorised copying or use of the author’s work. Similarly, computer software can be protected legally by a copyright, which establishes a limitation on how a person may legally use the program.

In most cases, you are given the right to use the software on one computer and to make a single **archival copy** of the software as a backup to guard against accidental loss. Sometimes a software company will grant the buyer the right to use the software on more than one computer, **a site license**, for example the right to use the software on all computers installed at a single location or within a company.

Although you may “get away” with making copy for a friend, you really are breaking the law, unless the software you are using is public domain software or share software that gives you the right to copy it.

**Summary**

In this lesson we have discussed that application package can be grouped into two broad categories: specialised and generalised. A specialised application package performs a specific task and cannot be changed or programmed to perform a different task. A generalised application package is the one that can be applied to a variety of tasks.

**Progress Test**

1. Application software is developed from two main sources. What are they?
2. With reference to (i), discuss the advantages and disadvantages of the software mentioned.

# UNIT 2 LESSON 5

# CATEGORIES OF APPLICATION SOFTWARE

**Introduction**

Dear learner, welcome to lesson 5 of Unit 2. In lesson 4, we discussed the concept application software, type of application software and also the importance of application software. In this lesson we shall look at some types of application software like word processing, data managers, electronic spreadsheets and graphic packages.

Activity 1

Discuss the disadvantages of prewritten software

………………………………………………………………………………………………………………………………………………………………………………………………

**Objectives**

By the end of the lesson you will be able to:

1. Mention at least four categories of application software
2. Discuss the importance of at least four application software

**The Five Categories of Application Software**

1. Productivity software e.g. word processing, spreadsheet, database, e-mail etc.
2. Education/reference software e.g. Encyclopaedias, Library, searches etc.
3. Specialty software e.g. desktop publishing, project management, multimedia authoring etc.
4. Entertainment software e.g. games etc.
5. Home/personal software e.g. cookbooks, medical, home repair etc.

**Productivity Software**

They are software designed purposely for generally use. Examples are;

**Word Processing**

At some time, you have been required handwrite or type a long term paper or similar document; and you know just how time consuming editing and rewriting the text can be. A word processor can make the job simpler, easier and faster. A word processor is software that lets the user edit, manipulate, and print text. It automates many tasks associated with writing in longhand and typing, such as cutting and pasting, cantering and setting margins. WordStar, MultiMate Advantage and WordPerfect are three of t e most popular word processors.

**Data Managers**

The demand that data and information be organised and accessible in different formats has exceeded what can be done manually in a reasonable amount of time. Data managers were developed in answer to this demand. Data managers stores, organises, manipulate, retrieve, display and print data. The term data manager describes file management systems and database management systems.

A file management system is a program that stores, manipulate and prints data stored in separate files. A database management system is a program that stores, manipulate and prints data in a database. In a database, data from more than one file can be accessed at the same time. At home you might use data managers to itemise valuable personal items or to list address and phone numbers of friends, relatives or business contacts.

**Electronic Spreadsheets**

A spreadsheet program is software that displays, manipulates and prints rows and columns of data. It is similar to a paper spreadsheet in that both columns and rows in which data are labelled and entered. The difference lies in the fact that data in an electronic spreadsheet are then recalculated automatically and the results stored. Electronic spreadsheets can perform a lot of takes from budgeting personal income to financial planning for a corporation. Lotus 1-2-3, Microsoft Excel, is some of the popular spreadsheets.

**Graphic Packages**

Graphic packages display data visually in the form of graphic images. For example someone using a spreadsheet or data manager to manipulate and organise data may find it difficult to see relationships or interpret the information. Presenting the information visually (graphically) is one way to make the task easier. One type of graphic package can extract and display data graphically in line, pie, or bar charts. Business managers use graphic packages to present statistics and other data and their relationships to staff or to client. At home you could use graphics to create a bar chart that shows if your monthly spending varied from your budget. Graphic packages are available that enable the artist to draw pictures and engineers to create designs.

**Presentation Graphics**

Another form of graphic software of one that assists in preparing materials for presentation purposes–slides and handouts for speakers or instructors. Microsoft’s power point ca use input from a variety of sources including video images and computer – created art, which can then be combined with texts and other images. Outputs from these programs can be to photographic slides, printed outputs, or video projection device for a computer aided presentation.

**Speciality Software**

They mostly use for unique production. These are;

**Desktop publishing**

This is a concept that combines the use of a microcomputer with word processor, page combination and graphics software, and high quality laser printers to create newsletters, magazines and other publications. Page-composition software as PageMaker has been developed for both MS-DOS system using Microsoft Windows and Apple Macintosh. Anyone can use such a system to create and publish documents, for example, departments within corporations that want to publish in-house, small businesses, small magazine publishers and writers who like the idea of self-publishing, booklets, brochures, newsletters and annual reports.

**Communication Packages**

As more individuals and companies use computers, the need to transfer data from one computer to another has increased. Law enforcement agencies exchange information on criminals, home users access information services such as CompuServe or Prodigy and some individuals and business send electronic mail. To facilitate such communication between computers, communication packages such as Pro-Com are used.

**Educational Software**

Any software that is used in teaching and learning. Some educational software includes, Encarta, Encyclopaedia, Software dictionaries, Educational software facilitates teaching and learning. Some have been designed to keep the learner in suspense and motivated to arrive at the correct answer. In most of this educational software he learner is given feedback on performance as her or she moves from one stage to the other. Educational software usually makes use of multimedia elements.

The importance of this software includes the following:

* it serves as a research materials
* it serves as a teaching and learning material
* it promotes self pace learning

**Integrated Packages (All-in-One Solutions)**

Integrated software allows several programs to share the same data. For examples, a graphic package can sue data directly from spreadsheet file to draw a graph. Integration also implies similar functions and a common set of commands and keystrokes among programs. In reality, however, this happens in varying degrees. Nevertheless, the result of integration is that, the user can work faster, more efficiently and thus more productively, than if non-integrated programs were used.

**Summary**

Dear learner, you have learnt in this lesson the categories of application software with examples. As well as, integrated packages (All-in-One).

We hope you enjoyed reading and discussion in the lesson. We hope you will tackle all the questions under the progress test.

**Progress Test**

1. List and discuss any three application software and their features.
2. Describe the functions of a word processor, data manager and electronic spreadsheet.

**The hologram of computer software**

**Software**

**Special Purpose**

**General Purpose**

**System Software**

**Application Software**

**Device Drivers**

**Utility Program**

**Operating System**

**Language Translator**

# UNIT 2 LESSON 6

# COMMUNICATION AND NETWORKS (1)

**Introduction**

Once again, you are welcome to lesson 6 of Unit 2. In this lesson, we shall look at the ways in which computers communicate. In addition we shall discuss the difference between digital and analog data.

**Objectives**

By the end of the lesson you will be able to:

1. Explain what communication is
2. Identify the features of data communication
3. Discuss digital and analog data
4. Identify what a modem is

**Communication**

Perhaps the simplest way to explain communication is giving and receiving information. For communication to exist there should be perfect connection and understanding of all the objects and gargets involved. The most important thing to consider in communication is that there should be sharing of resources and information.

Computer **communications** is the process of sharing data, programs, and information between two or more computers. OR

**Communication**; is the process of **sending** and **receiving** information through a communication channel.

Below are numerous applications that depend on communication systems:

* **E-mail –** provides a fast, efficient alternative to traditional mail by sending and receiving electronic documents.
* **Instant messaging –** supports direct, “live” electronic communication between two or more friends.
* **Internet telephone –** provide a very low cost alternative to long distance telephone calls using electronic voice delivery.
* **Electronic commerce –** buying and selling goods electronically

**Data Communication**; is the process of sending data from one point to another through a communication channel.

The process of using communication facilities such as the telephone system and microwave relays to send data between computers in a form of data communication referred to as **telecommunication** or **teleprocessing.**

To understand data communication and networking, you should first be familiar with the terms and technical side of t he subject. He two forms of data communication are **analog** and **digital.**

**Form of Data Transmission**

**Analog data transmission** is the passage of data in a continuous wave form. The telephone system is based on analog transmission.



Analog Data Transmission

**Digital data transmission** is the passage of data using distinct on and off electrical state, and therefore represented by 0s and 1s. Recall that the data in a digital form are represented as either on (1) or off (0). Because the computer “understands” and works in digital form. The Computer understands and uses digital data. It would seem that all data communication between computers would be in digital form; but that is not the case.

Total digital transmission is possible and is growing, however, the telephone system, designed as an analog is used for a great percentage of data communication, because it is the largest and widely used communication system in place. Because of the expensive involved in converting to a digital system or running a duplicate digital system, a method was developed that allows digital signals to be transmitted over telephone lines. The process is called **modulation-demodulation**.

0 1 0 0 1 0 1 0

Fig. 7b Digital data transmission

**Connecting Device**

These devices act as an interface between the sending and receiving devices and the communication channel.

A great deal of computer communication takes place over telephone lines. However, because the telephone was originally designed for voice transmission, telephones typically send and receive **analog signals**, which are continuously electronic waves. Computers, in contrast, send and receive **digital signals.** These represent the presence of an electronic pulse – the on/off binary signals we mentioned earlier. To convert the digital to analog signals and vice versa, you need a modem.

**Modem**

Modem stands for **Modulator and Demodulator**. It is a communication device/equipment used to convert data in digital form to analog form so that it (data) can be carried over the telephone line and vice versa.

The process of converting digital signal to analog signal is called **modulation. Demodulation** is the process of reconverting the analog signal back to a digital signal. The modem enables digital microcomputers to communicate across analog telephone lines. This communication includes both voice and data communications.

The speed with which modems transmit data varies. This speed, called **transfer speed or** **transfer rate**, is typically measured in **bits per second (bps).** The higher the speed, the faster you can send and receive information. For example, transferring an image might take 75 seconds with a 33.6 kbps modem and only 45 seconds with a 56kbps modem. The modem speed is measured in **bit per second (BPS).**

**Types of Modem**

There are four basic types of modems: external, internal, PC Card, and wireless.

* The **external modem** stands apart from the computer and typically is connected by a cable to the computer’s serial port. Another cable connects the modem to the telephone wall jack.
* The **internal modem** consists of a plug in circuit board inside the system unit. A telephone cable connects the modem to the telephone wall jack.
* The **PC card** modem is a credit card-size expansion board that is inserted into portable computers. A telephone cable connects the modem to the telephone wall jack.
* A **wireless modem** may be internal, external, or PC card. Unlike the other modems, it does not use cables. Instead, wireless modems send and receive through the air.

Most external direct-connect modems have variety of features including the ability to handle these activities.

* Checking the operating status using status light and speakers
* Changing the speed at which data is transmitted
* Dialling and answering the phone automatically
* Responding to commands from a communication program
* Self-testing to verify its own ability to correctly transmit data

**Summary**

In this lesson we have look at what communication is and also data communication. We have also discussed digital data and analog data transmission. Types of modems and their specific functions have been highlighted.

**Progress Test**

1. What is communication data?
2. Describe the difference between analog and digital data transmission
3. How does a modem function?

# UNIT 2 LESSON 7

# COMMUNICATION AND NETWORKS (2)

**Introduction**

Dear learner, you are welcome to lesson 7 of Unit 2. In lesson 6, we discussed data communication, analog and digital data transmission and modems. Before we look at t he objective of this lesson, let us try this activity.

**Activity 1**

Discuss three (3) activities that external direct-connect modems can perform.

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We believe that the answers you provided to activity one include the following

* Checking the operating status using status light and speakers
* Changing the speed at which data is transmitted
* Dialling and answering the phone automatically
* Responding to commands from a communication program
* Self-testing to verify its own ability to correctly transmit data

In this lesson we shall discuss some communication channels and channel configurations.

**Objectives**

By the end of the lesson, you will be able to explain

1. What communication network is
2. List and explain the major features of the internet
3. Ways of searching for information on the internet

**What is Communication Network?**

**Communication** **network** is a collection of computers and other equipment organized to share data, information, hardware and software through a communication channel.

**Computer** **Network**: This is a system in which a number of independent computers are linked together to share resources.

**Internet (international networking)**

**Internet** is global collection of high – powered computers that are connected to each other with connection medium, using rules and procedures that guide the formatting and transmission of data between computers defined by the protocols.

**Internet Concept and Terminology**

The following components are needed for the internet to work effectively.

**Protocol**; the rules for exchanging data between computers in a network (i.e. they determined how communications are across a network).

**Transmission Control Protocol/ Internet protocol (TCP/IP)**; is a set of rules that an application can use to package its information for sending across the network(s). TCP is responsible for breaking up large batch of data into little data packets. IP is responsible for packing the destination address information in these packets.

**Routers**; are specialized computers that read the addresses of **packets** and direct the packets to their destinations. Always the router checks for traffic and determines the best path before it sends the data.

**Domain Name**; describes organization or geographic realities. They either indicate the country the network connection is in, or what organization owns it and sometime further details. A computer that translates the domain name of another computer into an IP address, and vice versa, upon request is known as DNS Server. Examples are;

* com - commercial
* edu - education
* org - usually private organizations and others
* de - Germany (Deutschland)
* in - India.

**Internet Service Provider (ISP)**

The ISPs are providers who are already connected to the internet and provide a path or connection for individual to access the internet. A user buys a subscription to a service provider which gives the user an identifying user name and password and a telephone number. Some service provider limit the amount of time a user can spend on the internet. Examples of ISPs are; Africa online, CompuServe, MSN, AT&T, WorldNet, etc.

**Connecting to the Internet**

**Dial-up connections**; this is connecting to an internet host through a modem and standard telephone lines. The data is stored on the host computer and not on your computer. It operates on the same principle as making phone call. With dial-up your modem makes a call to ISP to gain internet connection before you can browse. This connection is slow as compared to broadband connection. **ADSL (asymmetric digital subscriber line)** is one of the most widely used types of DSL. This technology is widely available in most areas.

**Broadband connections**; The broadband connection offer data transmission speed comparable to direct connection speeds. Broadband connections are always on; you don’t need to dial in. The internet is instantly available anytime, like TV or radio. Broadband is base on these technologies:

* **DSL (digital subscriber line).** Is a technology for bringing high-bandwidth connections to homes and small business over ordinary copper telephone lines. DSL customers must be geographically close to phone company service hubs.
* **Cable modem connection**. Cable modems come from TV companies. Sometimes this connection is slow because a single cable may be shared by an entire neighborhood so when users goes up, speeds can go down.
* **Satellite connection**. This is available through many of the same satellite dishes that provide television channels to viewers.

**Direct connection**; this connection is connecting directly with the ISP server. When you are directly connected your files are stored on your computer, not on a remote host; and response time is much faster.

Dial-up modem connection

Internet



Telephone line

Modem

ISP

Computer

Satellite connection



ISP

Satellite dish

Satellite

Internet

Satellite modem

Computer

* **Wireless broadband connection.** This is where a computer is connected to the internet without cables, but through short-range radio waves. To access the network your laptop or computer must have a wireless PC card installed.

**World Wide Web (WWW)**

World Wide Web (WWW, W3, or Web); is actually the superset of the internet. It is part of the internet which supports a huge collection of “pages” of information linked to each other around the globe. Each page can have many links that take you to new destination. Web pages can be linked to other pages anywhere in the world.

**Web browser**

In order to surf the internet, you will need a software program called a **web browser.** A web browser is software that allows users to access, read and view any document on the web. That is software for viewing web pages or software that enables users to lunch the internet onto their computer. It is your gateway to the World Wide Web (www). The web browser looks much like the program for writing letters and reports. However, with a web browser, you cannot actually edit the information it displays. You can only read, save, or print out what you see on the screen. There are a number of web browsers that users can use to access the web. The popular ones are:



**Uses of Browsers**

* It allows user to access used information on the web server.
* It downloads information over phone lines to a user computer
* It creates illusion of travelling to an actual location in visual space when the document being viewed exists
* Display a variety of test and graphics that may be integrated into such a document including animation audio or video

**Web page:** Is a single unit of information, often called a document which is available via the World Wide Web.The web pages are viewed using an application called **web browser**. e.g. internet explorer. Documents on web pages are called **hypertext** if the media is text only or **hypermedia** if the media includes graphics as well as text.

**Hyperlinks**

Using hyperlinks to move from one place to another is one of the most common activities on the World Wide Web. To find a link on the page, look for text that is displayed in a different colour or image. When the text or the image is a hyperlink the cursor changes to a human hand when move over it. By default, hyperlinks that are text and have not been used are blue. Links you have already visited are purple. These colours can be changed, however. To open a link, place the mouse pointer over the hyperlink and click. There will be a short delay after you click on the hyperlink.

**Web site**: Is a collection of web pages created and maintained by organisations, educational institutions, businesses and individuals. Basically, a group of web pages are called **Web sites.**

**Hypertext Markup Language (HTML)**

HTML is a standardised codes or tags that are used to define the structure of information on a web page. Web pages (documents) are written in a language called **Hypertext Markup Language (HTML)**. An html source document is a text file that includes codes that describe the format, layout and logical structure of a hypermedia document on a web page.

**Hypertext Transfer Protocol (HTTP)**

Http is a set of rules or protocol, which govern the transfer of hypertext between two or more computers. That is the protocol for transferring web pages or exchanging information over the web.

**Uniform Resource Locator (URL)**

Every web site has a unique address called a URL. The URL is a string of letters or numbers that help to locate a particular website for information on the web. It identifies a particular internet resource for example a web page, an image or a text file. The URL for the Cable News Network web site is http://www.cnn.com. The URL http://www.uew.edu.gh is the website address for University of Education Winneba.

The format of the URL http:/ /www.cnn.com/showbiz /movies.htm is shown below: The first part ‘http’ is the **Protocol**, the second part ‘www.cnn.com’ is the **Host** (web server name and Domain name), the third part ‘showbiz’ is the **Path** (Folder name), the last part ‘movies.htm’ is the **Filename and filename extension**.

http : / / www.cnn.com / showbiz / movies.htm

***Protocol*** ***Host*** (web server name and domain name) ***Path*** (folder name) ***Filename and filename extension***

**File Transfer Protocol (FTP)**

File Transfer Protocol (FTP); is an Internet standard for transferring files from one computer to another. Many computers on the Internet allow you to copy file to your computer. This is called **downloading**. You can use FTP to copy files from your computer to another computer on the internet. This is called **uploading**. FTP is used to:

* Promote sharing of files (computer programs and or data).
* Transfer data reliably, and efficiently.

**Internet Address**

In order to communicate across the Internet, a computer must have a unique address, that unique numeric identifier or address is called an **Internet Protocol (IP) address**. IP address: is an identifier for a particular machine on a particular network. Each IP address consist of two parts, the network address and host address. The network address identifies the entire network. Each machine on the same network shares that network address as part of its IP address. The host address identifies a particular machine on the network. This how individual users are identified to receive file transfer, e-mail messages, and file requests. The IP address a set of four numbers (32 bits) separated by period (a dot). The numbers ranges between 0 and 255.

**Characteristics of IP Address**

* IP address are unique
* No two machines can have the same IP number
* IP address are also global and standardised
* All machines connected to the internet agree to use the same scheme for establishing an address.
* IP addresses work well for communication between computers but people often have difficulty remembering a series of numbers. As a result, many host computers have easy-to-remember names that translate directly to the computer’s IP address. These names are called URL.

**Major Features of Internet**

Discussion groups; you can use email to communicate in **discussion groups** with people you do not know but with whom you wish to share ideas and interests. Discussion groups include;

* **Newsgroups**; it’s one of the internet based services which include thousands of news groups. Each new group hold discussion on specific topic and the news groups’ indicates its users. To participate in the news group one need a news reader program.
* **Internet Relay Chat** (**IRC**); this software is available free from several locations on the internet. Using client- chart software, you log on the server, select topic in which you are interested, and begin chatting. To participate, you need access to server that supports IRC. This is done using special chart- client software.
* **Telnet**; is an internet standard that allows you to connect to another computer (host) on the internet and to log on to that computer as if you were on a terminal in the next room. There are hundreds of computers on the internet that you can connect to. Some allow limited free access, and others charge fee for their use.

**E- mail**

People normally connect to the internet because of the communication access it provides. The basic communication tool of the internet is e-mail. The e-mail stands for *electronic mail*. It is a means of sending and receiving information between computers on the internet. The basic structure of an e-mail address in oct@yahoo.edu

* “oce” is the user ID or Username.
* “@” the symbol is pronounced ‘AT’.
* “Yahoo” is name of the company or the computer (server) that maintains the mailbox. Yahoo.edu is the domain name.
* “.edu” describes the type of the organization and this is education.

**How the data travels on the internet**

When a message is sent on internet, the message is broken into small pieces called “**packets**”. Packets are the basic unit of measurement on the Internet. There are special purpose computers called “Routers” on the internet, which decide what is the best path to the destination to send these packets. Once these packets reach their destination they are reassembled into the original message.

**Uses of Internet**

The internet could be use for the following:

* Send and receive messages from other people using the Electronic mail (E-Mail)
* Search for job
* Plan a career
* Apply for jobs on-line
* Apply for grants (or money) for research
* Read National and international Newspapers and magazines
* Listen to radio Broadcasts
* Do your banking online
* Buy and Sell
* Look for pen pals
* For Advertisement
* Visit libraries to make references
* Play games
* Search for schools
* Chat with friends
* Visit famous museums
* Watch videos and television

**Summary**

Dear learner, we hope you have enjoyed discussing this lesson. We hope you will prepare a summary of this lesson on your own into your jotter.

**Progress Test**

1. How would you encourage your fellow colleague to use the internet?
2. Discuss three major features of the internet.

# UNIT 2 LESSON 8

# COMMUNICATION AND NETWORKS (3)

**Introduction**

Dear learner, you are welcome to lesson 8 of Unit 2. We hope you remember all that we discussed in the previous lessons. Let us try this activity.

**Activity 1**

Explain what a browser is and discuss its importance in the teaching and learning process

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**Objectives**

By the end of the lesson you will be able to

1. Explain what a search engine is
2. Discuss the types of network
3. Discuss the uses of networking in schools

**Search Engine**

Web search engines are special software programmes that may be used to search for information on the Internet.. This means that a search engine is able to help you obtain the information that you are looking for on the world wide web, The search results are usually presented in a list of results and are commonly called ***hits.*** Search engines are very vitalfor students and teachers and indeed all who use the Internet. The Uniform Resource Locator (URL) or Internet addresses of some search engines are as follows:

* http://www.google.com
* http://www.alexa.com
* http://searchnetworking.techtarget.com
* http://www.altavista.com
* http://www.yahoo.com etc

**How to search for information on the internet**

* Type the address of the search engine like www.google.com in the address bar and press the enter key to display the homepage.
* Type the information you want in the search box and press the enter key or click the google search button below the search box if you are using the google search engine. This will display the hits page.
* In the hits page you may find a list of titles on the information that you are looking for.
* Look through for the one that best fit your topic and click on it to display the results.
* Read through the results, but if you don’t want the information you just have to click on the backward navigation button to display the hits page again, and then you search through the hits for another one.

**Searching Information on the Internet**

Ways of searching:

* Search database or search engines
* Searching with keywords
* Searching with directories
* Metasearch site
* Natural language search sites

**Types of network**

Remember we’ve explain network as a group of computers contenting together to share resources, and information.

* **Local Area Networks (LANs)**: These systems designed connect computers in relatively close proximity. Typically LANs are owned and operated by individual organizations such as colleges, universities, private or government organization. LANs provide two benefits:

**Economic** - people can share costly equipment

**Flexibility** - other equipment, microcomputer can be to the LAN.

* **Metropolitan Area Networks (MANs)**: these networks are frequently used as links between office buildings in a city. For example, many organizations use MANs to connect their office buildings located throughout a city. Unlike a LAN, a MAN is typically not owned by a single organization. Rather, it is either owned by a group of organizations who jointly own and operate the network or by a single network service provider who provides network services for a fee. Cellular phone systems expand the flexibility of MANs by allowing links to car phones and portable phones.
* **Wide Area Networks (WANs)**: these networks are countrywide and worldwide networks. These networks provide access to regional service (MAN) providers and typically span distances greater than 100 miles. They use microwave relays and satellites to reach users over long distance. The widest of all WANs, is the internet, which spans the entire globe.

The primary difference between a LAN, MAN, and WAN is the geographical range. Each may have various combinations of hardware, such as microcomputers, minicomputers, mainframe and various peripheral devices.

**Networking in School:**

This is the connection where computers within a school can share data, information and other resources. In other cases, the connection is extended to other schools within a specific geographical area.

Uses of networking in the classroom

* It enable users to share common hardware resources, e.g. printer
* Improves collaborative learning, such as company database
* It gives freedom to users regarding where they want to use their PCs

**Wireless Area Network:**

Wireless connection allows user to connect their computer and communicate without physical cables. Wireless connection is common in school.

Wireless connection includes;

* Microwave station;
* Communication satellites
* Cellular radio transmission
* Bluetooth

**Summary**

Dear learner, we hope you have enjoyed discussing this lesson. We’ve learnt how to search for information and type of network.

**Progress Test**

1. Given a classroom with one computer, list and explain briefly five (5) things you would do to integrate ICT in teaching and learning.

# UNIT 2: CLOSURE

# SOFTWARE AND APPLICATIONS

**Introduction**

Dear learner all too soon we have come to the end of this Unit. We hope you have enjoyed reading and discussing all the contents in their various lessons. Congrats

**Summary**

The following were discussed in the lesson

* The meaning of system software and application software
* Categories of operating system and what it does
* The concept of user-friendly operating system, user interface and forms of user interface
* Identification of packaged software as type of application software
* The importance of packaged software and user-written developed software
* Explanation of what communication is and features of data communication
* The idea of internet and its importance in educational setting

**End-of-Unit Exercises**

1. Discuss five characteristics of secondary storage devices
2. Discuss RAM and ROM and state their importance
3. List three differences between memory and storage
4. List and discuss three physical devices used for recording computer data in a permanent or temporary form
5. Explain the role of operating systems
6. List four productivity software, discuss their features and uses

# UNIT 3

# COMPUTER SECURITY AND MULTIMEDIA

**Introduction**

Dear learner, you are welcome to this unit of the course. In this unit we are going to discuss some securities regard to the use of the computers. I hope in your homes some of you home security men, due to some factors. The same way, there is the need for us to pay much attention to it. Enjoy yourself as you read on.

**Objectives**

By the end of the Unit, you will be able to;

1. Explain the meaning of a virus
2. List at least two different types of viruses
3. Explain that a particular computer is infected
4. Mention two ways of doing away with virus
5. List the elements of multimedia
6. Technology integration

# UNIT 3 LESSON 1

# COMPUTER SECURITY (1)

**Introduction**

Dear learner, you are welcome to lesson 1 of Unit 3. In this lesson, we shall be discussing what a virus is and the types of viruses. Keep your fingers crossed and enjoy the lesson.

**Objectives**

By the end of the lesson you will be able to;

1. Explain computer security
2. Explain the meaning of a virus
3. List at least two different types of viruses.
4. State and explain viruses spread.

**What is Computer Security?**

This is defined as techniques developed to safeguard the computer and information systems stored in the computer (the method of protecting data, programs and hardware.).

Is a techniques developed to protect computers and network linked computers systems from accidental or intentional harm.

**What is Computer Security Risk?**

Is any event or action that can cause a loss of or damage to computer equipment, software, data and information, or processing capability.

Among the threat to computer security is destruction of computer hardware and software, theft, unauthorized use, observation, or disclosure of computer data.

Computer and the information they contain are often considered confidential systems because their use is typically restricted to a limited number of users.

Now let look at some of the threat to computer systems such as; hardware, software and peoples.

**Computer Hardware Threats**; these are harmful event that occur to the computer’s hardware.

**Computer threats include:**

* **Theft**: people steal parts of the computer like CD ROM drive, memory card etc to sell or use it fix other damaged computers.
* **Dust**: the accumulation of dust inside the computer begins to temper with the proper functioning of the electric circuit in the computer. It also blocks the air supply to some of the computer components such as CPU and fan which makes the computer heat up quickly.
* **Power fluctuation/Electrical faults:** due to power fluctuation or continuous power cut, it reduces the lifespan of the computer by gradually destroying the hard disk.
* **Rodent/insects**: rodents like mouse can chew the data cables in the system unit which will prevent it from booting.
* **Liquids**: spillage of liquids such as water on the computer can cause rust of the some component and will prevent proper functioning of the computer.

**Protecting the computer from power fluctuation/electrical faults**

1. **Using surge protector**: Is an appliance designed to protect electrical devices from power surges or over voltage that is when the power is increases above the normal volts and under voltage when the power drops below the normal volts.
2. **Using uninterruptible power supply (UPS)**: Is a device or battery that provides power when the primary source power is unavailable. This stores power so when the source power is lost UPS provides power for some minutes so that you save your work and shut down your system.
3. **Using Voltage stabilizer**: Is an electrical regulator designed to automatically maintain a constant voltage level for your device.

Apart from the above measures you can still protect your computer from electrical faults.

* Unplug all cables from the electrical socket when the computer is not in use.
* Avoid using the computer in the event of a rain storm.
* Check the wires of the computer regularly to see if they are in good working condition.
* Never operate the computer when there is low or over voltage.

**Protecting the computer from dust or water**

1. Do not setup computer near window because this exposes the computer to a lot of dust and water especially in the event of a storm.
2. Cover the computer with a dust cover when you finish working with it.
3. Clean computers regularly, at least, once in a week using blower.

**Protecting the computer from cockroaches and** **rodents.**

1. The room where the computer is setup should be free from dirt.
2. Do not drop food in and around where the computer is setup.

**Other things you can do to safeguard your computer**

* Encryption
* Passwords
* Firewalls
* Approved Users

**Encryption**

Another technique to protect confidential information is encryption. Computer users can scramble information to prevent unauthorized users from accessing it. Authorized users can unscramble the information when needed by using a secret code called a key. Without the key the scrambled information would be impossible or very difficult to unscramble.

**Passwords**

Passwords are confidential sequences of characters that allow approved persons to make use of specified computers, software, or information. To be effective, passwords must be difficult to guess and should not be found in dictionaries. Effective passwords contain a variety of characters and symbols that are not part of the alphabet

**Firewalls**

A firewall is software or hardware that checks information coming from the Internet or a network, and then either blocks it or allows it to pass through to your computer, depending on your firewall settings. A firewall can help prevent hackers or malicious software (such as worms) from gaining access to your computer through a network or the Internet.

**Approved Users**

Another technique to help prevent abuse and misuse of computer data is to limit the use of computers and data files to approved persons. Security software can verify the identity of computer users and limit their privileges to use, view, and alter files. The software also securely records their actions to establish accountability. Some of things that can be used to restrict users’ access are;

* **Logon:** combination of unique user name and Password. This prevent unauthorized user from logging on into the computer system.
* **Smart Cards:** this contains a user photograph and embedded microchip that stores data about the user including a password that changes periodically.
* **Biometric:** scanning devices such as fingerprint, and retinal (eye) Scanners can be used to check the true identity of a user before he is allowed access.

**Threats to computer software**; these are harmful event that cause damage to computer’s software.

* Modification of program
* Unauthorized use
* Computer virus

**Activity 1**

I hope you have heard the term **virus** before. Can you briefly explain it?

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May be your definition might be either of the following

**Computer Virus;** Is a hidden set of instructions (software) buried in another set of instructions (software) with the ability to move from one computer to another causing damage.

Virus is a computer program that replicates itself and transfers itself to another computer system. Virus is a kind of malicious code (program) that cause damage to programs and make the system crash.

Virus is also a computer program that is part of another and inserts copies of itself, often damaging the integrity of stored data.

Computer virus travels with the program that contains it, and it cannot infect human being since it is electronic instructions.

There are two categories of viruses **Benign** and then **Malignant.**

The first category of virus (**benign**) displays a message or slows down your computer but does not destroy any information.

**Malignant** virus, however, do damage to the computer system. Some will scramble or delete your files. Others shut your computer down, make your word software act strangely or damage the compact flash memory in your digital camera so that it will not store pictures any more.

**Examples of viruses**

* **Boot sector or partition table virus:** Boot sector is the area of the computer that is accessed when the computer is turned on. This type of virus attack the booting portion of the operating system on the computer thereby destroying the operating system. When this happens the user may need to reinstall the operating system.
* **Worm** is a program that multiplies on its own to make numerous copies of itself. Worms slow down the computer making it difficult to work with.
* **Trojan Horses** look like very useful programs but only end up destroying the files on the computer. This type of virus does not reproduce themselves like worms.
* **Resident Viruses:** This type of virus dwells in the RAM memory. It interrupts all of the operations executed by the system by corrupting files and programs that are opened, closed, copied, renamed etc.
* **Direct Action Viruses:**The main purpose of this virus is to replicate and take action when it is executed. When a specific condition is met, the virus will go into action and infect files in the directory or folder that it is in and in directories that are specified in the AUTOEXEC.BAT file PATH.
* **Overwrite Viruses:**Virus of this kind is characterized by the fact that it deletes the information contained in the files that it infects, rendering them partially or totally useless once they have been infected.
* **Macro Virus:**Macro viruses infect files that are created using certain applications or programs that contain macros.
* **Directory Virus:**Directory viruses change the paths that indicate the location of a file. By executing a program (file with the extension .EXE or .COM) which has been infected by a virus, you are unknowingly running the virus program, while the original file and program have been previously moved by the virus.
* **Polymorphic Viruses:** Polymorphic viruses encrypt or encode themselves in a different way (using different algorithms and encryption keys) every time they infect a system. This makes it impossible for anti-viruses to find them.
* **Companion Viruses:** They are known as companion viruses because once they get into the system they "accompany" the other files that already exist.
* **FAT Virus:** The file allocation table or FAT is the part of a disk used to connect information and is a vital part of the normal functioning of the computer. This type of virus attack can be especially dangerous, by preventing access to certain sections of the disk where important files are stored.

**Features that can be used to identify if your pc is infected or not**

* They change the configuration of the system. Sometimes changes the current date and shows files and funny characters that are not letters.
* At times it makes it impossible to load some software into the memory by displaying a message “Insufficient space e.g. data lock.
* Makes computer run very slowly? A common symptom of a virus is much slower than normal computer performance.
* Programs starting or closing automatically or Windows shutting down suddenly.

**How Viruses may Affect Files**.

Viruses can affect any files; however, usually attack **.com, .exe, .sys, .bin, .pif or any data files** - Viruses have the capability of infecting any file; however, will generally infect executable files or data files, such as word or excel documents that are opened frequently and allow the virus to try infecting other files more often.

**Increase the files size** - When infecting files, virtues will generally increase the size of the file; however, with more sophisticated viruses these changes can be hidden.

**It can delete files as the file is run** - Because most files are loaded into memory, once the program is in memory the virus can delete the file used to execute the virus.

**It can corrupt files randomly** - Some destructive viruses are not designed to destroy random data but instead randomly delete or corrupt files.

**It can cause write protect errors when executing .exe files from a write protected disk** - Viruses may need to write themselves to files that are executed; because of this, if a diskette is write protected, you may receive a write protection error.

**It can convert .exe files to .com files** - Viruses may use a separate file to run the program and rename the original file to another extension so the exe is run before the com.

**It can reboot the computer when executed** - Numerous computer viruses have been designed to cause a computer to reboot, freeze, or perform other tasks not normally exhibited by the computer.

**What Viruses may do to a Computer**

Below are different issues you may experience when you are infected with a virus. Keep in mind that you also may be experiencing any of the below issues by another computer related issue and not a virus.

* Deleted files.
* Various messages in files or on programs.
* Changes volume label.
* Marks clusters as bad in the FAT.
* Randomly overwrites sectors on the hard disk.
* Create more than one partition.
* Attempts to access the hard disk drive, which can result in error messages such as "Invalid drive specification".
* Causes cross-linked files.
* Causes a "sector not found" error.
* Cause the system to run slow.
* Logical partitions created, partitions decrease in size.
* A directory may be displayed as garbage.
* Directory order may be modified so files, such as COM files, will start at the beginning of the directory.
* Cause Hardware problems such as keyboard keys remapped or not working, printer issues, modem issues etc.
* Disable ports such as .COM ports.
* Alter the system time / date.
* Cause system to hang or freeze randomly.
* Cause activity on [HDD](http://www.computerhope.com/jargon/h/harddriv.htm) or [FDD](http://www.computerhope.com/jargon/f/fdd.htm) randomly.
* Increases file size.
* Increase or decrease memory size.
* Randomly change file or memory size.
* Extended boot times.
* Increase disk access times.
* Cause computer to make strange noises, make music, clicking noises or beeps.
* Display pictures randomly.
* Unusual or undocumented error messages.

**Sources of Computer Viruses**

There are several sources of computer viruses. Among them are:

1. ***Removable storage media/devices:*** These media/devices are used to store and transfer data and information (files) from one computer to another. Examples are pen drive, CD, DVD, memory cards, and external hard drive. If a computer system is infected with virus and you copy files from such computer onto storage medium, the virus attaches itself to the files and remains on the removable storage medium.
2. ***Local Area Network (Intranet):*** This is where computers in an office or laboratory are linked to each other to share information. The presence of virus on any computer in such network can easily spread to other computers.
3. ***Internet downloads:*** This occurs when one downloads information which is infected with virus onto his/her computer. Some internet users deliberately send e-mails that are actually viruses to unsuspecting people. Such virus begins to work when the users open their mails to read.
4. ***Plug and play devices (electronic gadget):*** Recent research indicates that electronic viruses have been spreading though plugging new gadgets into the computer. Such gadgets include mobile phone, digital camera, Bluetooth devices, modem, etc. Infected plug and play device can easily transmit the virus onto the computer.
5. ***Information:*** The use of virus infected information such as music, video, programs and files can infect a computer.

**Effects of viruses on computers**

* + Destroy files.
  + Corrupt (destroy) operating system and programs.
  + Damage hard drives and other storage media and devices.
  + Increase the size of a file leading to low hard disk space.
  + Slow down the computer’s operation (cause the computer to freeze).
  + Virus might steal important information from your computer and send to some other person.
  + Virus might change the power rating of your computer and could blast the system.

**Protecting the computer from viruses**

1. keep a reliable backup
2. Get a virus protection toolkit and use it frequently. Keep it updated. **Antivirus programs** are software programs designed to detect, disinfect, and protect computers and networks from viruses e.g. AVG, Panda, Norton, Mcafee, etc
3. Do not use the mouse without a mouse pad
4. Keep Windows updated by turning on Automatic Updates.
5. Visit only known sites and don't follow random links.
6. Scan all information / data daily.
7. If your computer does contract a virus, be prepared to reformat and start all over again.
8. Foreign diskettes are to be scanned before usage.
9. Use a firewall.‌ Windows Firewall or any other firewall can help alert you to suspicious activity if a virus or worm attempts to connect to your computer

**A Firewall** is software or hardware that checks information coming from the Internet or a network, and then either blocks it or allows it to pass through to your computer, depending on your firewall settings.

Dear learner let us now consider some of the characteristics of viruses

* It replicates itself
* It is secretly designed
* Can be transmitted from one system to another
* Once detected can be removed

Dear learner, all too soon, we have come to the end of another session. In this discussion, we looked at the meaning of computer security, meaning or virus, types and some examples of virus. I hope your appetite is wet and you want more stuff. Good.

**Progress Test**

1. What is computer security?
2. A computer is infected with virus in your school.

(a) Explain why this happened and how to prevent that in future.

(b) What is the use of anti-virus software in computer security?

(c) Name 2 antivirus software you know.

# UNIT 3 LESSON 2

# COMPUTER SECURITY (2)

**Introduction**

Dear learner, you are warmly welcome to lesson 2 of Unit 3. In unit 1, we talked about computer security and viruses. In this lesson we shall continue by looking at threat to computer uses as well as back up

**Activity 1**

1. Discuss with your colleague how will you detect that your computer is infected with a virus

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**Objectives**

By the end of the lesson you will be able to:

1. Discuss threat to computer users
2. Explain what a is system failure
3. Explain what is backup
4. Mention the types of backup
5. Discuss the importance of backup

**Threat to Computer Users**

Along with the benefits of computer technology comes the potential for unwelcome side effects. For people who work long hour with computers, the side effects include bad posture and bad vision and other health related problems due to radiation emissions, repetitive-stress injuries, eyestrain and headache and back and neck pains. As a result of this, there has been a great interest in a field known as **ergonomics.**

**Ergonomics** (sometimes called human engineering) is the science that studies the factors relating to things that people use. Ergonomic studies suggest preventative measures you can take to protect your health as you work with computers.

1. **Choose equipment that’s ergonomically designed.** When you are buying computer equipment look beyond functionality. Use magazine reviews, manufacturer’s information, and personal research to check on health-related factors such as monitor radiation and glare, disk-drive noise level and keyboard layout.
2. **Create a healthy workspace**. Keep the paper copy of your work at close to the same height as your screen. Position your monitor and lights to minimize glare. Sit at arm’s length from your monitor to minimize radiation risks. Align your body so that your head is supported by your spine; don’t slouch or lean forward. Feet on the floor, and elbows at a 90 degree angle.
3. **Build flexibility into your work environment**. Whenever possible work with an adjustable table and monitor and a removable keyboard, change your work position frequently.**.**
4. **Rest your eyes**. Look up from the screen periodically and focus on a far away object or scene. Blink your eyes frequently. Take a 15-minute break from using the video display unit (VDU) every 2 hours. Your eyes should be at least one and a half to two feet from your monitor.
5. **When tired refresh yourself with some exercise**. Do some simple stretches to loosen tight muscles. Occasional stretching of the muscles in your arms, hands, wrist, back, shoulders and lower body can make hours of computer work more comfortable and less harmful.
6. **Use optical glass monitor filter**. This reduces the risk of radiation emissions from the display unit.
7. Room should be well ventilated and there should be a good lighting system.
8. **Seek help when you need it**. When you are having persistent problem that may be related to excessive computer work, talk to a professional or a medical doctor may be able to help you before it becomes chronic.

# 

**System Failure**

A system failure is a sudden computer malfunction as a result of electrical power problems, hardware component such as disk drive failure, or software or program error resulting in the loss of all save and unsaved data.

An under voltage occurs when the electrical power supply drops. An over voltage, or power surge, occurs when the incoming electrical power increases significantly above the normal 120 volts. A surge protector keeps an over voltage from damaging computer equipment. With electrical power fluctuation, UPS (Uninterrupted Power Supply) can be used.

**Backup Procedures**

Backup is a duplicate of a file, program, which can be used if the original is lost, damaged, or destroyed. Files can be restored by copying the backed up files to their original location on the computer. Backup copies should be kept in fireproof and heatproof safe or offsite in order to prevent it from stolen or catching fire.

Storing backup copies of software and data and having backup computer and communication capabilities are important basic safeguards because the data can then be restored if it was altered or destroyed by a computer crime or accident such as natural hazards; fires, floods, hurricanes, tornadoes and earthquakes are all natural hazards that can lead to destruction of the computer system.

Civil strike and terrorism; wars, riots, student demonstration and terrorism are real risk in every country.

**Three Types of Backup that can be Performed are**

* **Full backup**, which copies all of the files in the computer.
* **Differential backup**, which copies only the files that have changed since the last full backup.
* **Incremental backup**, which copies only the files that have changed since the last full or last incremental backup.

**Some users implement a three-generation backup procedure to preserve three copies of important files.**

* The **grandparent** is the oldest copy of the file.
* The **parent** is the second oldest copy of the file.
* The **child** is the most recent copy of the file.

**Why do you need to back up your computer?**

The most important thing that you store on your computer is information. Often the contents of a hard disk can represent years of work. If the hard disk stops working one day you could lose all those years of work. For this reason it is VITAL that you take regular backups of the information that is stored on the computer. Back ups are done against viruses, and unforeseen circumstances being it natural disasters, theft etc. In large organizations this backup procedure is normally performed automatically by your computer support team, where the data is normally held on a centralized, networked computer.

###### Importance of Backup

1. To get the original copy.
2. To prevent psychological effect.
3. For future use.

**Summary**

Dear learner, we have come to the end of this session. I hope you have taken note of the important points discussed. In this lesson we talked about threat to computer users, system failure and back up procedures.

**Progress Test**

1. Explain the term system failure.
2. Why is it important to backup?

# UNIT 3 LESSON 3

# MULTIMEDIA

**Introduction**

Dear learner, once again welcome to another lesson 3 of unit 3. In this lesson we shall be discussing Multimedia, elements of multimedia and then multimedia applications. Though the term seem to be unfamiliar to you, but then do not be afraid, relax and read on and you will be happy.

**Objectives**

By the end of the lesson you will be able to:

1. Explain the meaning of multimedia
2. State and explain at least thee elements of multimedia

When you sit at the back of your television, sometimes you watch adverts or musical clips. In the case of the advertisement, you realised that a message is being put across using different means as possible. Again when you watch a musical clip, a message is also sent across using different means e.g. slow dancing, different picture background etc.

**What is Multimedia?**

* It means being able to communicate in more than one way for better interaction.
* Integration of all sort of media elements into one presentation
* Execution of text, graphics, sound, and animation simultaneously in a presentation.

Effective multimedia presentations incorporate user participation or interactivity. **Interactivity** allows the user to choose the information to view, control the pace and flow of information, and to respond to items and receive feedback.

The act of responding to question posed by multimedia system is **interactivity**.

**Elements of Multimedia**

There are five main elements which make up a typical multimedia program. They are:

Text, sound/audio, graphics, animation and video.

* **Text** includes characters used to create word, sentences, and paragraphs which are aimed at presenting information to your audience or students. The use of different styles, fonts and colours can be used to emphasize specific words or phrases.
* **Graphics** are digital representation of information other than text. For example drawing, chat, photograph, pictures or image. Some of these contain no movements or animation. Graphic can illustrate certain concepts more vividly than text and therefore play an important role in teaching and learning. Most people retain a higher percentage of materials they see graphically. Most software applications used today are graphic based.
* **Animation** is a graphic that has the illusion of motion. They can convey information more vividly than text. It is achieved by displaying a series of still graphics. They range from basic graphic with simple motion to a detailed image with complex movements. They are used to provide better illustration about how certain devices, equipment, system and phenomena work more than text can do. It is used in a variety of ways to improve the quality and make both educational software and website more fascinating. Animation is measured in frame per second, (fps).
* **Video** is a combination of text, graphics and images and sound with visual effect to present information. Students can be made to dramatize a situation or an event based on a topic especially those that centres on morality and self conduct and this could be incorporated in a multimedia.
* **Sounds/Audio:** Sound can be added to a multimedia presentation from a variety of sources. Original sounds can be recorded using a microphone and programs such as Hyper Studio, Movie Works, or Smart Sound. These applications, as well as QuickTime Pro, can also be used to import sounds from an audio CD or the Internet.

**Multimedia Applications**

They are integrated computer programs designed to help people perform a certain type of work. The various field of using multimedia applications;

Education

* Computer aided instruction (instructional program on CD e.g. CBT, CAI, WBT, Tutorials etc)
* Mavis Beacon, Drill – practise software
* Electronic book
* Multimedia Encyclopaedias (Microsoft Encarta Encyclopaedia)

Public

* Electronic Newspaper, Electronic museum
* Information Kiosk system ( medical, legal, banking, shopping, tourist etc)
* Digital libraries

Home

* Video on demand
* Home shopping
* Interactive TV
* Electronic album
* Personalized electronic journals

Business / Office

* Executive information system
* Remote consulting systems
* Multimedia mail /document
* Advertising / Electronic publishing
* Collaborative work

**Computer Based Training (CBT)**

An interactive instructional approach in which the computer, taking the place of an instructor, provides a series of stimuli to the student ranging from questions to be answered to choices or decisions to be made. The CBT then provides feedback based on the student’s response. It can be looked at the use of a computer as teaching machine to deliver instruction. CBT in recent years has become supplanted by web – based training (WBT). CBT now generally refers to off – line, stand – alone instruction delivered by computer.

However, the increase in PCcomputing power, and especially the growing prevalence of computers equipped with CD-ROMs, is making CBT a more viable option for corporations and individuals alike. Many PC applications now come with some modest form of CBT, often called a tutorial. Typical example is Mavis Beacon

**Web-Based Training (WBT)**

A form of computer – based training in which the training materials resides on the web pages accessible through the World Wide Web. Typical media elements used are text and graphics. Other media such as animation, audio, and video can be used, but require more bandwidth and in some cases additional software. The terms “online courses” and “web-based instructions” are sometimes used interchangeably with WBT.

Here training on typing, and other software like Word, Excel, and PowerPoint could be learnt from the web through a well packaged tutorials. E.g. www.learthat.com

**Computer Aided/Assisted Instructions (CAI)**

Is a teaching process in which the computer is used to improve teaching and learning process. CAI software teaches specific skills and knowledge based on specific content area and level. It comes in a form of; presentation, demonstration, tutorial, drill and practice, simulation, games, etc.

**Drill and practice**; assumes previous skills and that further practice are necessary for mastery.

**Educational Simulation software**; provide an approximation of reality etc.

**Tutorial activity**; include drill and practice, games and simulation. Tutorial program will provide an opportunity to enhance previous learning or create new learning based on curriculum objective. Good Tutorial offers help scenes to give further explanation or further illustration. It will also be able to interpret the amount of information to present and how to present it. When we evaluate Tutorials, we nee to evaluate if the Tutorial is not only able to present information, but must be able to interpret wrong answers. When it interprets wrong answers it should have the ability to continue the lesson form that point by providing feedback on the misunderstood information before continuing with new information. For class discussion on excel, the learner could use excel tutorial as a reinforcement of whatever was discussed.

**Electronic Books (e-book)**

Electronic Book is the electronic counterpart of a printed book, which can be viewed on a desktop, or laptop computer or DPA. Numerous e-books can be kept on the same laptop, computer or handheld, that users take on the road eliminating weight and volume compared to the equivalent paper books. Electronic bookmarks made referencing easier, and most readers allow the user to annotate pages.

Technical books are especially suited for e-books delivery because they can be searched. In addition, programming code examples can be quickly copied, which is why CD – ROMs that contain the entire text of the work have been included in the back of many technical paper books.

**Information Kiosk**

Information kiosk is a computer based terminal or display that is used to provide information or services, typically in a public places such as museums, airports hotels etc. kiosk systems are being used in a variety of applications, including information directories, customer self-service terminals electronic catalogs, internet access terminal, tourism guides and more. Some sophisticated kiosks let user interact and include touch screens, sound and motion video. A number of companies specialise in creating multimedia kiosks. A simple kiosk can be created using HTML pages and graphics, setting the type size large enough to attract people from a short distance and removing the web browser’s tool bar so that the display screen is effectively in “kiosk mode”, t he presentation can be designed to simply loop through a series of pages or to allow user interaction ad exploration.

**Education Software for Basic Schools**

**Children’s learning and home learning**

An immense number of titles, probably running into the 1000’s were developed and released from t he mid-1990’s onwards, aimed primarily at the home education of younger children. Later iterations of these titles often began to link educational content to school curricula (such as England’s National Curriculum).

The design of educational software programs for home use has been influenced strongly by computer gaming concepts – in other words, **they are designed to be fun as well as educational**. However as far as possible a distinction should be drawn between proper learning titles (such as these) and software where the gaming outweighs the educational value (described later). Parents need such a distinction in order to make informed purchasing choices.

The following are examples of children’s learning software which have a structured pedagogical approach, usually **orientated** **towards** **literacy** and **numeracy** **skills**.

* Knowledge Adventure’s Jumpstars and Maths Blaster series
* The Learning Company’s Reader Rabbit and Zoombinis series
* Disney Interactive learning titles based on characters such as Winnie-the-Pooh, Aladdin, The Jungle Book and Mickey Mouse
* Titles targeted at older children tend to focus more narrowly on reference (see below) or examination training.

**Classroom Aids**

A further category of educational software is **software designed for use in school classrooms**. Typically such software may be projected onto a large whiteboard at the front of the class and/or run simultaneously on a network of desktop computers in a classroom. This type of software is often called **classroom management software** While teachers often choose to use educational software from other categories in their IT suites (e.g. reference works, children’s software), a whole category of educational software has grown up specifically intended to assist classroom teaching. Branding has been less strong in this category than in those categories orientated towards home users. Software titles are often very specialised and produced by a wide variety of manufacturers, including many established educational book publishers.

The schoolzone.co.uk Guide to Digital Resources, 5th ed. (2005) – An up-to-date full-colour guide with reviews of around 500 selected and recommended products, categorised by subject area, albeit specific to the UK school system.

**Edutainment**

In a broader sense, the term edutainment describes an intentional merger of computer games and educational software into a single product (and could therefore also comprise more serious titles described above under children’s learning software). In the narrow sense used here, the term describes educational software which is primarily about entertainment but tends to educate as well and sells itself partly under the educational umbrella. Software of this kind is not structured towards school curricula, does not normally involve educational advisors and does not focus on core skills such as literacy and numeracy.

Examples:

* Microsoft’s Zoo Tycoon series, where children can learn about animals (and business skills) while simulating the management of a zoo.
* Economic simulations such as Capitalism and Industry Giant, intended for older learners.
* Encarta kids, where children learn new things as they play.

**Features / Characteristics of Multimedia**

The first thing that characterise multimedia application is its interactive nature.

* **Interactivity/user participation:** This allows users to choose the information to view, to control the pace and free flow of information and respond to items and receive feedback.
* **Links:** This provides connections to related information. An interaction multimedia presentation is typically organized as a series of vacated pages. Each page present information and provides links or connections to related information. these information can be found; video, audio, text or graphics, which is accessed through the links provided.
* **Buttons:** this enables users to navigate through a multimedia application and accessed information. By clicking on a special area called button you can make appropriate links and navigate through a presentation to locate and discover information.

**Uses and Importance of Multimedia in the Classroom**

* When multimedia is used for lesson presentation, it makes teaching and learning much child centred. This motivates students to learn and also reduce the boredom in the classroom.
* Both learners and teachers are able to do effective and sequential lesson presentation when using multimedia like PowerPoint in teaching and learning.
* It allows lesson variation in terms of teaching methods and skills and also TLM. You can choose to use video, audio or text as your TLM when teaching.
* It provides much room for research and learning for both teachers and students.
* The interactive nature of multimedia motivates students to learn on their own.
* It permits students to learn at their own pace and time thereby catering for individual difference which is a little bit difficult to achieve in the presence of an instructor.
* Learners have the opportunity to choose the topic they desire to learn and can decide whether to take a test at a particular time or not.

**Importance of Multimedia Application**

* 1. Multimedia application serves as a means of advertising.
  2. Multimedia foster smooth dispatch of information through diverse means such as an online service delivers.
  3. multimedia applications also helps in training (education) because of its visual effects on learning thereby encouraging cooperative learning and problem solving skills among students as well as research.
  4. Multimedia applications are a source of entertainment.
  5. For industrial purposes, multimedia applications are most useful in the art, presentations and graphics industries.
  6. A multimedia program is designed to support the learning process. Multimedia offers the experience of listening, looking and doing in a computer-mediated setting. It can be interesting; motivating, exciting and help students achieve understanding in new ways.
  7. The use of sound, photographs and video enables the user to observe real world situations which us just not possible with the more conventional methods of instruction. There is also a high level of interaction. Most packages expect students to make choices about what they want to do next and the way in which they wish to work through the materials. They are not passive but expect learners to actively participate.
  8. Education courses, skills and knowledge are too often taught out of context. To overcome this, educators are using multimedia to bring into their classrooms real-world examples to provide a contextual framework important for learning. Multimedia and tools like the Internet give faculty instant access to millions of resources. These materials can be called up instantly for cooperative learning, critical thinking, discussions, problem solving and self-study.
  9. Multimedia will help spread the information age to millions of teachers/learners who have not yet used the computer. Multimedia educational computing is one of the fastest growing markets in t he world today.
  10. Commercial and educational available generic course wares to support commercial products are emerging. For these reasons, it is important to share information about what goes into the development of multimedia, and the appropriate use of multimedia, so that educators can make wise choices in selecting instructional applications.

**Problems of Multimedia Application**

1. It requires a lot of time for teacher preparation to master multimedia.
2. There are not enough trainers to train teachers to use multimedia programs.
3. Training requires funds and commitments from schools and central government.
4. Students may need sufficient on-line time and their computers must be configured for hyper-media authoring.
5. Multimedia use become difficult where there is no light.

**Summary**

Dear learner, all too soon we have come to the end of this discussion. In this lesson we discussed multimedia, its elements, importance in the classroom as well as its importance in general. I hope you have enjoyed the lesson.

**Progress Test**

1. Briefly explain problems of multimedia application in teaching.
2. Explain the following multimedia terms (i) graphics (ii) animation
3. What is Computer Assisted Instruction? Show how they help in education and training.
4. Explain why Microsoft Power Point can be used for Multimedia Presentation.

# UNIT 3 LESSON 4

# TECHNOLOGY INTEGRATION

**Introduction**

Dear learner, you are welcome to lesson 4 of Unit 3. In this lesson we shall be looking at educational technology and its related issues.

**Objectives**

By the end of the lesson, you will be able to

1. Explain the concept technology and educational technology
2. State at least four differences between technology instruction and classroom instruction
3. State ways of chaining classroom instruction
4. Discuss some of the barriers to technology integration
5. List at least five strategies for teaching with technology and
6. Discuss how to plan for technology integration in the classroom

**What is Technology?**

It involves the method, theory and practices governing the application of practical mechanical sciences, to appropriate field such as education. It is the scientific way of attending to problems.

Again it can also be said that technology is the term for the processes by which human beings fashion tools and machines to increase their control and understanding of the environment.

**What then is Educational Technology?**

It is the application of technological knowledge and skills in education. Such applications have brought about drastic innovations in the method and effectiveness of teaching. Some of these innovations include filmstrips, slides, projections – and other mechanical and electronic devices to present systematic instructions to students. Others may include programmed instructions – delivered to students in a graded sequence of steps mostly by means of the computer or other device.

Dear learner let us discuss the terms Curriculum and Integration briefly.

**Curriculum**

It is concerned with the area of learning experiences to be organised by teacher; both within and outside the school, to enable pupils to adapt a positive attitude to learning to acquire and apply knowledge and skills, and to develop their tastes and a balanced sense of values.

**Integration**

It simply means the incorporation of different entities into a unified body or system providing equality of opportunity with regards to the various components.

**Integrating technology into the curriculum**

Explanation: it is the application of tools and equipment embodied in technology for the achievement of educational goals and objectives embodied in the curriculum.

**Differences between Technology Instruction and Classroom Instruction**

|  |  |
| --- | --- |
| **TECHNOLOGY INSTRUCTION** | **CLASSROOM INSTRUCTION** |
| Provide equal access and opportunity for every learner to get the best learning experiences. | Provides unequal access in the classroom situation |
| As a result of integration learners regard computers as tools needed in all aspects of their studies. | Chalkboards are extensively used, teacher interaction with pupils is total |
| Learners have the opportunity of selecting the medium best suited to convey their message | Learners source of reference is limited to only what the facilitator provides |
| It has impact on other curriculum area through varied forms of multimedia presentations | Individual differences are not adequately catered for. |
| It provides access to mainstream materials and enables the students express their thoughts in words, designs and activities for those with special educational needs. |  |

**Changing instructional strategy**

Strategy is the act of employing all deserving elements of power of an entity to accomplish the objective of a project.

**Ways of changing instructional strategy**

* The formulation of achievable objectives to be accomplished
* Selection of appropriate materials and tools (technological tools)
* Designing appropriate methods which should be based technologically based e.g. Encarta, the use of search engines.

**Barriers to technology integration**

Lack of infrastructure

Lack of administrative support

Lack of electricity

Inadequate number of computers

**Strategies for teaching with technology**

Obtaining the appropriate software

Obtaining the appropriate supporting hardware LCD, projector and screen

Employing appropriate methodology

Acquisition of knowledge on the proper use of the appropriate software, the hardware and the method

Knowledge about the pros and cons about the technology to be used

Preparation of the minds of the learners well in advance

Preparation or accessing reading manuals

**Planning for technology integration in the classroom**

* Formulation of appropriate objectives
* Selecting tools and materials available for teaching
* Considering the knowledge and ability of learners
* Selecting the appropriate method for teaching
* Rehearsal of tools and materials (software and hardware)

**Summary**

Dear learner, all too soon we have come to the end of lesson 7 of Unit. We believe you have summarised all the main points in the lesson into your jotter. That’s good, keep it up.

**Progress Test**

* + 1. Why is computer technology important in education? Give five relevant reasons
    2. Discuss briefly three barriers to technology integration with your school in mind.
    3. How would you plan for technology integration in your school?

# UNIT 3: CLOSURE

# COMPUTER SECURITY AND MULTIMEDIA

**Introduction**

Dear learner, congrats! You have gone through Unit 3 of this module successfully. We hope you have enjoyed all the activities we have discussed.

**Summary**

The main ideas covered in this Unit were as follows:

* The meaning of computer security
* Types and categories of virus
* Virus detection and removal
* System failure and backup
* The concept of multimedia and elements and areas used
* Multimedia applications and importance
* Educational technology and its integration

**End-of-Unit Exercises**

1. List and discuss five types of virus
2. How would you protect your PC from virus?
3. Discuss the importance of multimedia in teaching and learning
4. What are the barriers to technology integration?

# COURSE CLOSURE

# INTRODUCTION TO INFORMATION TECHNOLOGY

**Introduction**

Dear learner, welcome back and congrats. All too soon you have successfully gone through this course. We hope that you found the lesson interesting and the contents manageable. We wish you well in your semester courses.

**Summary**

The cardinal points in this module were discussed around the following:

* Meaning and functions of computer system
* Software and its application
* Communication and network and importance to teaching and learning
* Protecting the computer

**End-of-Course Questions**

Dear learner, even though you were set some tasks and you answered some questions at the end of each lesson and unit, we still wish to end the whole course with some questions that cut across all the units.

These questions would serve as revision of the entire course for you, but more particularly they are intended to prepare you adequately for the end-of-semester examination, therefore learner, go through the questions on your own. We wish you the best of luck.

**Questions**

1. How would you perform a “warm boot”?
2. Where you lose your information if you turn off the computer without saving your work?
3. What name is given to the TV like component of the computer?
4. A red wavy line under a word you have typed, means what?
5. How would you describe the common pointing device found on PC?
6. What other name is given to application software?
7. In your own words describe the processing cycle.
8. What is the difference between a bit and a byte?
9. Explain computer literacy and its importance to teacher.
10. Differentiate between the primary memory and secondary storage.
11. Explain what are computer viruses?
12. How can you protect your personal computer against computer viruses?
13. What is a word processor?
14. What are the main features of a modern word processor? List six of them.
15. How would you explain backup in Computing?
16. Discuss four advantages and four disadvantages of application software.
17. When is backup used? How would you protect your data on the floppy diskette from being accidentally erased?
18. Discuss the importance of network in schools
19. How can you protect your computer system form virus infection?
20. Discuss the importance of multi media application.

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