

Preface

This resource is designed for teachers who are just starting out using ICT (Information Communication Technology) in their working practices - in the classroom and students who are preparing for Subsidiary Information and Communication Technology at A level. That being said, there is no instruction within this resource that is limited to use by a teacher and a student, this could be a useful resource for covering the basics of ICT with your students too or, and here's a radical thought - why not go through it together? Some of the instruction within this resource may be too simple for you - skip over those parts and dip into the bits that are useful; guide your own learning. .

As a teacher in the 21st Century classroom you are often going to come across students who know a good deal more about ICT than you do - and not just you but any average teacher. The children today are growing up immersed in technology, they are the Digital Natives, so don't be afraid to let them teach you or to learn together. As stated, this is really a basic introduction to ICT. I hope that it will give you enough knowledge to understand that technology need hold no fear for you - on the contrary, it can help, it can reduce workload - and it can be fun too.

Acknowledgement

I would like to express my gratitude to the many people who saw me through this book; to all those who provided support, talked things over, read, wrote, offered comments, allowed me to quote their remarks and assisted in the editing, proofreading and design.

Thanks to all my friends for sharing my happiness when starting this project and following with encouragement when it seemed too difficult to be completed. I would have probably given up without their support and example on what to do when you really want something.

Overview

Computers and other forms of technology impact our daily lives in a multitude of ways. We encounter computers in stores, restaurants, and other retail establishments. We use computers and the Internet regularly to obtain information, experience online entertainment, buy products and services, and communicate with others. Many of us carry a mobile phone or other mobile device with us at all times so we can remain in touch with others on a continual basis and can access Internet information as we need it. The government uses computers to support our nation's defense systems, for space exploration, for storing and organizing vital information about citizens, for law enforcement and military purposes, and other important tasks. In short, computers and computing technology are used in an endless number of ways. This book is a guide to computers and related technology and how they are being used in the world today. It will provide you with a comprehensive introduction to computer concepts and terminology and give you a solid foundation for any future courses you may take that are related to computers or their use in the world today. It will also provide you with the basic knowledge you need to understand and use computers in school, on the job, and in your personal life, as well as give you an overview of the various societal issues related to technology, such as security and privacy issues, ethical considerations, and environmental concerns. Chapter 1 is designed to help you understand what computers are, how they work, and how people use them. It introduces the important terms and concepts that you will encounter throughout this text and in discussions about computers with others. It also takes a brief look at how to use a computer to perform basic tasks .The chapter closes with an overview of the societal impact of computers.

INTRODUCTION

TO

COMPUTING

Chapter contents

Introduction to computers

World of ICTs

Implication of using ICTs

Chapter questions

The chapter introduces the learner to computers, their use and implications of using them in a variety of fields. It is developed bearing in mind that most of the learners might be encountering the subject for the first time. They need to attain the background knowledge to the use of computer systems across a number of fields. The topic lays a foundation to the rest of the topics. It should be well handled to give the learners a solid foundation in the subject.

Objective

This chapter familiarizes the student with the basics of computers. This should give the student a stepping stone to use when learning more specific details about computer hardware.

Pre-requisites

There are no prerequisites! You should be able to follow along no matter how little experience you have in this subject.

This topic is designed for students with no background in Computer studies. But if you're looking for hands-on computer skills, start with Computer Skills.

Introduction to computers

Definition: A computer is a programmable electronic device that accepts data; performs operations on that data; presents the results, and stores the data or results as needed. The fact that a computer is programmable means that a computer will do whatever the instructions-called the program-tell it to do. The programs used with a computer determine the tasks the computer is able to perform.

The four operations described in this definition are more technically referred to as input, processing, output and storage (information processing cycle). These four primary operations of a computer can be defined as follows;

Input : entering data into the computer.

Processing: performing operations on the data.

Output : presenting the results.

Storage: saving data, programs, or output for future use.

A storage device is an apparatus for storing data and information. A basic computer consists of 4 components: an input device, a CPU, output devices, and memory.

Parts of a computer

The basic parts of a desktop computer are the **computer case**, **monitor**, **keyboard**, **mouse**, and **power cord**. Each part plays an **important role** whenever you use a computer. The **computer case** is the metal and plastic box that **contains the main components** of the computer. It houses the motherboard, central processing unit (CPU), power supply, and more.



Data and information

In our definition, we said the computer accept data. Data consists of facts and numbers suitable for communication or interpretation. When people or computer acts on data, we call it processing.

Data is defined as raw facts and figures that have less meaning to the end user.

Or

Data is a collection of raw unprocessed facts, figures, and symbols.

Information is data that is organized, meaningful, and useful. To process data into information, a computer uses hardware and software.

In brief; information is processed data which is meaningful to the end user.

Phases of data processing.

Data processing is the processing of data into information. This processing includes refining, summarizing, categorizing, and otherwise manipulating data into a useful form.

Information processing cycle

I - input

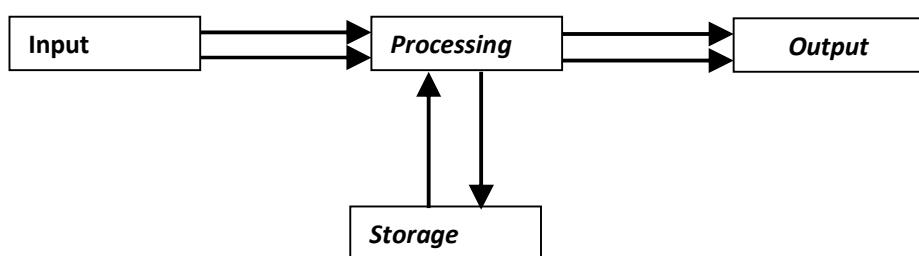
p - Processing

o - Output

s - Storage

All computers work the same way. Data is input into the computer; it analyses or processes the data and when the work is complete, outputs the results. The cycle continues thousands and millions of times a second.

Data processing means converting data into information



Information flow

Input

Data must first be gathered together and then input to the computer system. An example of raw data for input would be unorganized sales figures for different musical instruments sold by different sales people in different states. Input means data is converted to a form that can be processed by the computer.

Data is input into the computer with the help of keyboard, scanner, mouse networks and modems.

Processing:

In processing, data is manipulated in ways to convert it into information. Processing consists of classifying, sorting, and summarizing the input data. Processing also consists of performing calculations and other logical activities, such as comparing sales figure to see which musical instruments or which salespeople have higher sales.

Software programs and data are processed by the central processing unit (CPU)

Storage

Once displayed on the screen, the information will vanish when you turn the computer off. Thus, in order to use the information in the future, you need to store it. Storage is saving information in a computer usable form.

Software and data are stored on hard disks, compact discs, digital versatile discs and magnetic tapes

Output

Results of processing are produced using devices like printers, monitors, sound cards etc.

UNEБ 2016 Qn1 (a) In the modern world, every person is endeavoring to ease access to information. Give five reasons why students in secondary schools should not be allowed to have mobile phones

Students may abuse use of mobile phones by wrongly communicating to out of school

They may use mobile phones to watch undesirable material such as porn which lead to moral degeneration

They may waste time when spending time with the use of mobile phones rather than concentrating on academic matters

They may encourage theft among students who may wish to also own the same.

They may use mobile phones to committe crime such as drag trafficking, blackmail against school and teachers

Computer system

The way to think about a computer is as a system. The system is made up of five parts the purpose of the system is to process data into information. This processing proceeds through four phases of activity.

A computer system is a set of independent parts/device that work together to manage and process data and information.

A **computer system** is mainly a combination of five elements;

- ★ **Computer hardware.** (*These are tangible parts of a computer*)
- ★ **Computer software.** (*These are step by step instructions that tell the hardware how to perform a task*)
- ★ **Procedures** (*These are the guidelines to follow when using hardware, software, or data*)
- ★ **Data** (*It is raw, unevaluated facts and figures, concepts, or instructions.*)
- ★ **Human ware/ people** (*who need no definition, of course*) *are the most important component of a computer system. People operate the hardware,*

I suggest you review how the five elements of the computer system relate to the four phases of processing

create the software, put data into the system, and use the information that comes out of it)

Characteristics of modern computers

➤ Speed

Computers are quite fast in their operation in that their speed is measured in millions of instructions per second. It is capable of doing work assigned to it within a short time.

➤ Accuracy

Computers are very accurate machines and they hardly make any mistake. But mistakes depend on the user. A computer is capable of detecting and correcting the mistakes made by user. Therefore this applies if wrong data is entered into a computer, wrong results are expected i.e. ***garbage in garbage out.***

➤ Storage

For a computer to be able to work, it must have some form of work space where data is stored before being output to particular devices like hard disk/drive, floppy diskette, and flash disks etc. a computer can store data temporally during processing and permanently in its secondary storage devices for future reference.

➤ Computers are diligent

Computers have the capacity to perform the same task “over and over” for a long period of time without getting bored. This is evidenced in industrial robots like in car assembling company.

➤ Versatile

A computer is versatile i.e. it has capabilities of performing tasks in many different ways. All modern computers can perform different kind of tasks simultaneously.

➤ **Automation**

A computer is an automatic electric device which can perform several programmed routines without supervision e.g. booting (is the process of powering on and starting the operating system of the computer)

➤ **Artificial intelligence**

Computers have artificial intelligence i.e. they can respond to requests given to them and provide solutions to them. They are capable of doing so by use of programs to make decisions and functions accordingly.

➤ **Lack of feelings/ emotions**

Computers lack the ability to make judgment; don't suffer from stress or fatigue. They cannot differentiate between users, irrespective of age, gender, social status, etc.

UNEBC 2016 Qn.11 Explain the following attributes of computers which makes them dependable and reliable tools

(i) Diligence

Computers have the ability to perform the same task over and over again without getting bored. Being a machine, a computer does not suffer from human traits of tiredness and lack of concentration.

(ii) Versatile

Computers are capable of doing very many tasks competently. They can carry out a number of different tasks at the time and in different ways.

(iii) Accuracy

Computers are capable of detecting and correcting any mistakes made. They are capable of performing calculations to the extent of 24 decimal accuracy.

UNEBC 2013 Qn 18 State five characteristics of a modern computer

(05 marks)

➤ Computers are diligent.

➤ Computers are accurate

➤ Versatility

- ☞ Computers have *artificial intelligence*
- ☞ Automation. Computers work *automatically*
- ☞ Computers are *capable of storing large volumes of data and information*
- ☞ It has *a fast speed*

World of ICT

ICT refers to range of electronic tools for storing, displaying and exchanging information, and for communication. It is a technology used to transmit, store, create, share or exchange information for communication.

ICT is not limited to computers. People can use other ICT tools without having computers. In other parts of the country where schools cannot access computers, other equipment of ICT should be applied.

Examples of ICT tools include;

- ☞ Radios
- ☞ Television (TV)
- ☞ Video
- ☞ DVD
- ☞ Telephone
- ☞ Satellite systems
- ☞ Computers e.g. desktops, Laptops, etc.

UNEBC 2014 Qn 1 (a) Explain the term information and communication technology (2 marks)

ICT (*information and communications technology - or technologies*) is a general term that refers to communication devices for storing, displaying and exchanging information, as well as the various services and applications associated with them. ICT is not limited to computers. **OR**

It is the term which stresses the role of unified communications and the integration of telecommunications like telephone lines and wireless signals, computers as well as

necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

(b) State three ways in which information technology has improved communication.

(03 marks)

- IT has enabled faster delivery of messages through E-mails.
- It has enabled instant delivery of error notifications incase a message has not been delivered.
- IT has enabled voice communication through phone technology.
- Instant data communication e.g. instant messengers, chat rooms.

Uses of computers in society

(a) Homes

- Many people nowadays use computers for shopping purposes. (online shopping)-
- There is also a variety of entertaining information for those looking for leisure. This includes music, videos and games.
- People use computers in homes to pay bills through the payment by phone services (PPS).
- People use computers for education and research from home. People can take online courses.

(b) Office

- Managers use computers to create memos, letters and reports about their institutions.
- Bursars and cashiers use computers to calculate payroll, prepare income statements and balance sheets.
- Business managers use computers to track inventory and generate invoices and receipts.
- Computers have been used to present projects and ideas by means of presentation software.

- In offices, computers are used for communication through use of fax machines, electronic mails and videoconferencing.
- Through telecommuting, employees can work away from a company's standard workplace.

(c) Health

- ✍ They are used to maintain patient's records in hospitals, clinics and other health centers.
- ✍ They are used to monitor patients 'vital signs in hospitals, at home and clinics.
- ✍ They are used to carry out computer assisted medical tests in clinics and hospitals.
- ✍ They are used in diagnosing medical conditions of patients.

(d) Police

- ★ Police use computers to store databases on security controls such as fingerprints which are automatically analyzed by computers.
- ★ Traffic Police uses computer controlled traffic lights to control traffic flow on the roads.
- ★ They are used in computer based recognition and scene monitoring.
- ★ They are used in electronic news gathering.

(e) Education/schools.

- ❖ Students use computers and appropriate software to learn at their own pace. This
- ❖ Learning is known as Computer Assisted Learning (CAL).
- ❖ They use them as learning aids. Through use of computers and internet, E-learning¹ has been possible.
- ❖ They are used by researchers to quickly gather and analyze experimental data.
- ❖ They use them to do their assignments.

¹using a computer to deliver part, or all of a course whether it's in a school, part of your mandatory business training or a full distance learning course

UNEБ 2013 Qn 2 (a) Explain how computers can professionally be used by:

(i) Teachers

(02 marks)

- Computers can be used by teachers to search more knowledge concerning the subject they teach.
- They can be used in preparing presentations to be displayed in class.
- Computers can be used by teachers to keep students record.

(ii) Doctors (02 Marks)

- ☞ Computers can be used by doctors to perform surgery with the help of online support from more experienced doctors
- ☞ Computers can be used by doctors to store medical records of patients in a hospital.

Implications of using ICT

Advantages of computers

1. Industrial use.

Today modern industries use computers in the processing of goods, quality control and inventory management

2. Process Control

Computers are widely used in an environment to control chemical and mechanical processes.

3. Business purposes

Very many businesses have realized the benefits of a

4. Scientific Research

Recent advancement in scientific research have been possible due to the use of computers

5. Education Purpose.

With the development of a computer the Internet has emerged. Many local institutions have been linked with those big universities and libraries overseas hence

facilitating education and research. This further led to the creation of virtual universities i.e. universities with low physical buildings, lecture rooms or homes of residence but off course giving the necessary lectures on the internet thus the term **Virtual Reality**.

6. Banking

It is also used in efficiency management control in insurance and banking system to manage their large volume of task or work. Some other commercial application of computers is ATM (Automatic Teller Machine) which is used for 24 hours banking services.

5. Computers are also used in health line services i.e. Consultation to expensive foreign experts without traveling to their premises/countries.

7. Used in Mass Media.

Computers are also used in mass media by the use of internet. There are various news media such as BBC, WBS, CNN, and ALJAZEERA.

6. Employment

Employment opportunities in computing industries worldwide are at an increasing rate and many countries have developed because of their computing industry

7. Recreation Purpose.

When bored in the office, you can just use your computer to play some games such as golf, car- racing etc.

Disadvantages of using computers

Moral decay

Today the youth are glued on internet watching immoral Pictures, movies and magazines etc. i.e. pornography and coping western culture.

Forgery

Computers are misused by some people to create or make fake money, certificates, reports, passports, etc. using sophisticated printers

Power Consumption

Computers are electric devices therefore they need power to operate which is costly and cannot be afforded by many people.

Eye Defects

Computers can affect human eye sight especially to those users who are frequently using the computer hence they might end up putting on spectacles.

Loss of writing and spellings skills.

Since the computer doesn't involve the use of a pencil or a pen, it results into loss of writing skills and spelling skills since it is capable of correcting the user for any mistake made.

Unemployment

Computers are mainly used by literate people hence cannot be used by illiterate people hence causing unemployment amongst people in a society.

Body Fatigue

This is as a result of using of improper computer chairs and computer tables when using a computer.

This comes as a result of bad sitting posture.

Advantages of E learning;

- ✓ Learn on your own device. If your organization is against its employees bringing in their own device to work, you can access your learning when you are not at work.
- ✓ Learn at your own pace. ELearning recognizes that your needs are unique and lets you learn in your own time, in your own way, at your own pace.

- ✓ You will have access to a unique learning plan that has been designed keeping your job role and capabilities in mind.
- ✓ Get access to information as soon as you need it – courses are well structured, so you can find the information you need, easily.
- ✓ Self-evaluate. Self-assessments after every course let you know where you stand. If you are unable to fair well in a particular course, you have the option of redoing the course until you get it right.
- ✓ Get immediate answers to your most pressing questions through the interactive interface that connects you with peers and industry experts - across the globe.
- ✓ Train in a safe environment with simulated learning. This is especially useful for employees who are exposed to hazardous conditions like the pharmaceutical industry and those who must train on the use of heavy/dangerous machinery.
- ✓ ELearning is eco-friendly and drastically reduces your carbon footprint.
- ✓ Increase your overall productivity by training in your free time, when you are at home or traveling; it is accessible every day.
- ✓ You don't have to be connected to the internet. Organizations, whose employees are constantly on the move, make sure that they can train, offline; work is automatically uploaded when you are connected to the internet.
- ✓ Perform better, and have greater retention of what you have learnt, than your classroom-trained counterparts, and enjoy the fruit of being a top performer.

Green computing

Green computing refers to environmentally responsible usage of computers and related resources. It involves the use of efficient hardware equipment, reduced energy consumption and proper disposal of electronic wastes.

The common practices of green computing include;

- ✓ Turning off monitors when they are not in use

- ✓ Virtualization of servers
- ✓ Using more efficient and less noisy cooling systems
- ✓ Use of low power hardware
- ✓ Cloud computing
- ✓ Recycling and proper disposal of old computer hardware
- ✓ Less pollutant manufacturing

Chapter Questions

Qn1 .The term computer has changed meaning over years and in this modern era it has various descriptions.

(a)What does the term computer meant? (01 mark)

(b) State any four characteristics of computers that make them powerful? (04 marks)

Qn2.(a) State the difference between data and information giving an example in each case (02 marks)

(b) State any three devices that aid in transforming data into information (03 marks)

Qn3. (a) Explain the term information and communication technology (02 marks)

 (b) State three instances in which ICT has rendered people jobless in Uganda (03 marks)

Qn4. (a) Define the term computer system? (01 mark)

 (b) Explain the different components involved in a computer system(04 marks)

Qn5. Computers are known for their speed in transforming data into information

 (a) Define the term data? (01 mark)

 (b) List four stages which are involved in transforming data into information (04 marks)

Qn6.Briefly describe how ICTs are applied in each of the following areas (05 marks)

- (i) Health
- (ii) Business
- (iii) Education
- (iv) Security
- (v) Entertainment

Qn7.Explain with relevant examples how computers can be used within; (05 marks)

- (i) A bank
- (ii) A farm
- (iii) A supermarket
- (iv) A school
- (v) A hospital

Qn 8.(a) What is meant by the term Green computing? (01 mark)

(b) Explain any four measures for green computing (04 marks)

Qn 9. (a) State two ways in which ICT can be used to prevent terrorism (02 marks)

(b) list any three ICT tools that are used in your school in monitoring security (03 marks)

Qn 10.(a) Distinguish data from information (02 marks)

(b) Mention three reasons why a mobile phone is regarded as a computer (03 marks)

COMPUTER MANAGEMENT

Chapter contents

Introduction

Booting of a computer

File management

Common utilities

Print management

Chapter questions

Introduction

Interacting with computers and other ICTs for the first time is one of the most challenging tasks. However system developers invented storage media, system administrative tools, services and programs. Menus, graphics, commands and most interestingly voice recognition interfaces to facilitate the interaction and dialog between the system and the user.

It is important that you are introduced to the general operating system environment, common files and folders plus their management, and basic utilities.

Objective

The learner should be able to demonstrate that he can efficiently manage files.

Computer management is able to prepare participants to use different types of technology in everyday settings. This may include installing software, managing updates and performing backups on desktop computers, laptops or tablets. Computer management can prepare you to use a computer both on the job and in your personal life.

Prerequisites

This topic is designed for students to follow when they have already got an introduction to computing.

You should be having a theory background concerning powering on of a computer.

Booting Process

You may wonder what happens when the computer starts;

Most microcomputers are switched on by the switch on the system unit and the monitor.

As the computer is switched on, it does the Power – On Self-Test (POST) before it starts. The POST consists of RAM² check, CMOS (complementary metal oxide semiconductor) check, HDD controller check (Disk Drive controller Check)

In case one of the checks fails, then an appropriate error message is displayed on the screen or

An abnormal number of beeps are sounded.

Note: Each error has a specific number of beeps.

The whole process is called **BOOTING**.

Note: *CMOS memory stores vital data about system configuration, even when your computer is turned off.*

Definition

Booting is the process of starting a computer which involves loading an operating system into memory.

Types of booting

There are two types of booting;

- ★ Cold booting /Hard boot
- ★ Warm booting / soft boot

Cold booting

It is the process of starting a computer which has been previously off.

OR

It can also refer to the process of starting a computer from rest.

Warm booting

It is the process of restarting a computer that is already turned on. In the windows environment, it is normally performed by pressing Ctrl+Alt+Del keys on the Keyboard.

²*Random Access memory*

Application of booting

Booting is done in the following cases;

Cold booting is done always when one is starting up the computer which has been totally off.

Warm booting is done;

- Whenever the computer devices such as keyboards, mouse, etc. stop responding to commands issued to them.
- After installing a software or hardware onto your computer.
- After scanning for viruses.

Steps that occur during a cold boot using the windows operating system

- ❖ The power supply sends an electrical signal to the motherboard and other devices located in the system unit.
- ❖ The CPU resets itself and looks for the ROM that contains the BIOS.
- ❖ The BIOS executes the Power on Self-Test (POST) to ensure that all the computer hardware is connected properly and operating properly.
- ❖ The results of the POST are compared with the data in the CMOS chip on the motherboard.
- ❖ If the POST is completed successfully, the BIOS looks for the boot program that loads the
- ❖ Operating system.
- ❖ Once located, the boot program is loaded into memory and executed, which then loads the kernel of the operating system into RAM.

UNEБ 2013 Qn (a) Write the initial procedure of booting a computer system. (03 marks)

- ✓ The power supply sends an electrical signal to the motherboard and other devices located in the system unit.
- ✓ The CPU resets itself and looks for the ROM that contains the BIOS.

- ✓ The BIOS executes the Power on Self-Test (POST) to ensure that all the computer hardware is connected properly and operating properly.
- ✓ The results of the POST are compared with the data in the CMOS chip on the motherboard.
- ✓ If the POST is completed successfully, the BIOS looks for the boot program that loads the Operating system.
- ✓ Once located, the boot program is loaded into memory and executed, which then loads the kernel of the operating system into RAM.

File Management

Definition:

File. A file is a collection of related records. An example is an inventory file for sporting goods store. A file, made up of records, contains information on a specific topic, or group.

UNEB 2014 QnChoose the appropriate file extension from the list given for sentences (a) to (e).

.doc, .txt, .tif, .exe, .bat, .sys

(05 marks)

a) A program file that perform fundamental operations in a computer.

.sys

b) A Microsoft word file.

.doc

c) A file containing series of commands during boot up.

.bat

d) A plain file created using note pad.

.txt

e) A graphic file created using applications such as Adobe Photoshop

.tif

Folder

File Management System

The File Management System (or simply File System) is the layer of system software responsible for organizing and managing the storage of data on permanent media.

This media is often magnetic, eg: hard and floppy disk drives and tape streamers, but optical media such as CD-ROM and DVD are also commonplace, and solid state memory devices, such as pen drives or flash drives are becoming increasingly common.

UNEBC 2013 Qn4. (a) A student had a file on her laptop and wanted to transfer it to a computer in a laboratory. Give three devices that she can use to transfer the file. (03 mark)

- ✓ A flash disk
- ✓ A memory card,
- ✓ Optical CD drive,
- ✓ Hard disk drive

(b) Explain the following methods of transferring a file from one location to another.

(i) Drag (01 mark)

This refers to the moving of a file from one location of the screen to another

(ii) Copy (01 mark)

This refers to forming a duplicate of a file to get two or more copies leaving the original behind.

As you know, each storage device on a computer has a drive letter assigned to it. The table below shows a typical allocation of drive letters:

Drive	Description
A:	First floppy disk drive
B:	Second floppy disk drive (only normally found on older machines)
C:	Hard disk drive
D:	Optical drive (CD/DVD reader/rewriter)
E:	USB drive

If a machine has two hard disks, the second one is referred to as D: and the letters for subsequent devices are incremented, eg: the CD/DVD drive would then be E: and so on.

Many of these devices are bootable, meaning that the operating system can be loaded from them. The usual boot device is the hard disk, but a computer can also be booted from a floppy disk (often used in emergencies) or from a CD-ROM (often used for installing the operating system).

The order in which the computer attempts to boot from the various devices is known as the boot sequence. This can be adjusted via the BIOS, a set of instructions stored in a read-only memory chip which enable a computer to start the operating system and communicate with system devices.

A computer's file system can be regarded as analogous to a filing cabinet, as used for storing paper documents. The disk drives correspond to the drawers in the filing cabinet and the directories correspond to the folders stored in the drawers. The individual files, such as Word documents, spreadsheets etc. correspond to the sheets of paper stored in the folders of the filing cabinet.

UNEБ 2016 Qn 5. State five activities that can be performed on a computer when using a mouse piece (05 marks)

- ✓ Pointing at an item
- ✓ Clicking
- ✓ Dragging
- ✓ Highlighting
- ✓ Selecting an item
- ✓ Scrolling a bar

UNEБ 2015 Qn13 (a) Differentiate between copy a file and move file. (02 marks)

Copy file is where a file is duplicated to get two or more copies leaving the original behind
While

Move file is where a file is completely transferred from one position to another without leaving the original behind.

b) Study the file path below and answer questions that follow:

F:\accounts\bursar\fees.xls

(i) Identify the file name. (01 mark)

Fees or fees.xls

(ii) On what drive is the file located? (01 mark)

F

(iii) In which sub-folder is the file located? (01 mark)

Bursar

UNEБ 2014 Qn3 During a practical examination, students were required to open a blank file and save it as. D: STUDENT WORK |EOT PRACTICAL WORK|safety.doc.

a) State the name of the immediate sub folder in which the file must be saved (01 mark)

EOT PRACTICAL WORK

b) Write the root directory onto which the file must be saved. (02 marks)

D

Suggest an example of a computer application the student can use to create the file. (01 mark)

Word processor

c) State the name of the file represented by the above file path. (01 mark)

Safety or safety.doc

UNEN 2013 Qn 12. (a) A computer file is made up of a file name and a file extension.

(i) What is the purpose of a file extension? (02 marks)

It identifies the type of file

(ii) Write down the file extension for a word processor document. (01 mark)

.doc

.docx

(b) Okello deleted his file accidentally. In which two ways can he recover his file? (02 marks)

By restoring them from the recycle bin

By using a recovery software

Common Utility Programs

These are system software component which are used to support, enhance or expand the existing programs in a computer system.

OR

Utility programs are referred to as service programs which improve the performance of a computer.

Many operating system have utility programs built in for a common purposes. However, some utility programs are available separately and the common examples of utility programs include the following;

❖ Virus Protection

A virus protection utility is used to detect, remove or destroy viruses. This utility is also referred to as anti-virus utility or software. It is used to scan hard disks and memory to detect, remove or even destroy the viruses.

Note: *It is always important to update the anti-virus software frequently in order to detect new viruses.*

Examples of common anti-virus software utility include;

- ✓ Norton anti-virus.
- ✓ Dr Solomon's anti-virus.
- ✓ McAfee Virus Scan.
- ✓ Node32.
- ✓ Kaspersky anti-virus.
- ✓ Eset
- ✓ Smadav
- ✓ Avast

❖ **Archives**

Output a stream or a single file when provided with a directory or a set of files. Archive utilities, unlike archive suites, usually do not include compression or encryption capabilities. Some archive utilities may even have a separate un-archive utility for the reverse operation.

❖ **Backup software**

Can make copies of all information stored on a disk and restore either the entire disk (e.g. in an event of disk failure) or selected files (e.g. in an event of accidental deletion).

❖ **Clipboard managers**

Expand the clipboard functionality of an operating system.

❖ **Cryptographic** utilities encrypt and decrypt streams and files.

❖ **Data compression** utilities output a shorter stream or a smaller file when provided with a stream or file.

❖ **Data synchronization** utilities establish consistency among data from a source to target data storage and vice versa. There are several branches of this type of utility:

❖ File synchronization utilities maintain consistency between two sources. They may be used to create redundancy or backup copies but are also used to help users carry their digital music, photos and video in their mobile devices.

❖ Revision control utilities are intended to deal with situations where more than one user attempts to simultaneously modify the same file.

❖ **Debuggers** are used to test and "debug" other programs, mainly to solve programming errors. Also utilized for reverse engineering of software or systems.

❖ **Disk checkers** can scan operating hard drive.

❖ **Disk cleaners** can find files that are unnecessary to computer operation, or take up considerable amounts of space. Disk cleaner helps the user to decide what to delete when their hard disk is full.

❖ **Disk compression** utilities can transparently compress/uncompress the contents of a disk, increasing the capacity of the disk.

- ❖ **Disk defragmenters** can detect computer files whose contents are scattered across several locations on the hard disk, and move the fragments to one location to increase efficiency.
- ❖ **Disk partitions** can divide an individual drive into multiple logical drives, each with its own file system which can be mounted by the operating system and treated as an individual drive.
- ❖ **Disk space** analyzers for the visualization of disk space usage by getting the size for each folder (including sub folders) & files in folder or drive. Showing the distribution of the used space.
- ❖ **File managers** provide a convenient method of performing routine data management, email recovery and management tasks, such as deleting, renaming, cataloging, cataloging, moving, copying, merging, generating and modifying data sets.
- ❖ **Hex editors** directly modify the text or data of a file. These files could be data or an actual program.
- ❖ **Memory** testers check for memory failures.
- ❖ **Network utilities**
Analyze the computer's network connectivity, configure network settings, check data transfer or log events.
- ❖ **Package managers**
Are used to configure, install or keep up to date other software on a computer.
- ❖ **Registry cleaners**
Clean and optimize the Windows Registry by removing old registry keys that are no longer in use.
- ❖ **Screensavers**

Were desired to prevent phosphor burn-in on CRT and plasma computer monitors by blanking the screen or filling it with moving images or patterns when the computer is not in use. Contemporary screensavers are used primarily for entertainment or security.

- ❖ **System monitors** for monitoring resources and performance in a computer system.
- ❖ **System profilers** provide detailed information about the software installed and hardware attached to the computer.

UNEBC 2016 Qn 4 (a) Don is a new computer user. As an ICT student advise Don which tool to use ; (02 marks)

- (i) **To trace files he cannot locate**
Search utility
- (ii) **To trace a word from an open document**
Find tool using the keyboard shortcut (Ctrl + F)

Chapter Questions

- 1(a) Define the term computer booting (01 mark)
- (b) State two ways of booting a computer (02 marks)
- (c) Describe the process of cold booting a computer (02 marks)
- 2(a) Distinguish between a cold boot and a warm boot (02 marks)
- (b) State three ways of performing a warm boot (03 marks)
- 3(a) State two ways of booting a computer loaded with DOS or windows OS (02 marks)
- (b) State three possible dangers of shutting down a computer improperly (03 marks)
- 4(a) Describe the computer booting process (05 marks)
- 5(a) With an example, Define the term computer program (02 marks)
- (b) Outline the steps of starting a program (03 marks)
- 6(a) list any three programs that always run in the background when a computer is started (03 marks)

(b) A computer technician decided to restart a computer after realizing some problems. Give reasons why it was necessary for her to restart the computer. (02 marks)

7 (a) Distinguish between a folder and a file (02 marks)

(b) A computer file comprises a file name and a file extension separated by a dot. Explain the function of the file extension (03 marks)

8(a) what is meant by the term file extension? (01 mark)

(b) Give four examples of file extensions and the file types they represent (04 marks)

9(a) Define the term computer file? (01 mark)

(b) Describe the following path: C:\Users\documents\sub.pub (04 marks)

10 (a) List down any two details about a file that is stored by an operating system (02 marks)

(b) Describe three features of a file name (03 marks)

11(a) Define the term file attribute as used in operating system (02 marks)

(b) Explain three file attributes (03 marks)

12(a) what is an icon in a desktop environment (02 marks)

(b) state the major icons on the desktop (03 marks)

13 outline five ways a file may be kept secure in a computer (05 marks)

14 List five elements that can be displayed on the desktop screen of a normal working computer (05 marks)

15 (a) Explain how power on self-test is executed during booting (02 marks)

(b) State any three reasons for users to restart a personal computer running an ms windows operating system (03 marks)

**COMPUTER
LABORATORY CARE &
MAINTENANCE**

Chapter contents

Computer Literacy

Secure Laboratory Environment

Servicing and Maintenance

Chapter questions

The use of ICTs has a number of challenges for example, computers malfunction, laptops break down, servers go offline, networks become unavailable and computers slowdown with time, etc. All of these problems can be minimized by keeping up with regularly scheduled preventive maintenance activities. It is important for every user to have an idea on basic preventive maintenance in order to maintain the equipment in a good running condition. This topic will equip the learner with skills to maintain his/her computer systems in a good running condition and the safety measures to observe when working in a computer laboratory.

Objectives

When handling computer laboratory care and maintenance, the learners should be able to take care of computer systems & maintain (service) computer systems.

They should also be able to troubleshoot malfunctioning computer systems and restore them to a good running condition.

Pre-requisite

You should have at least basic knowledge concerning how a computer works and the basics of the different components of a working computer. We also encourage you to have the basic maintenance ideas theoretically in order to maintain the equipment in a good running condition.

Definitions:

A computer laboratory is a room that is specially designed and prepared to facilitate the installation of computers and to provide a safe conducive environment for teaching and learning of computer studies.

Meaning of computer literacy

Computer literacy is having an understanding of what a computer is and how to use it as a resource. Computer literacy is the ability to use computers and related technology efficiently, with

a range of skills covering levels from elementary use to programming and advanced problem solving.

Literacy, which understands, needs to be distinguished from competency, which is having a skill. Computer competency is having some skill with a computer so that you can use it to meet your information needs and improve your productivity.

UNEБ 2015 Qn12

(a) Describe the term computer literacy?

Refers to the knowledge and ability to use computers and related technology efficiently.

(b) Outline any three ways in which ICT can improve the quality of education

- ✓ Use of the internet tool eases research by students with the help of huge online libraries and dictionaries such as those of Wikipedia
- ✓ The use of internet enables distance learning
- ✓ Use of computer assisted instruction (CAI) such as smart boards, projectors enables better delivering of information.
- ✓ Use of electronic formats of storage of data and information such as use of solid state storage devices.
- ✓ Computer assisted assessment enables students to be examined and assessed any time
- ✓ Use of output hardware such as printers enable the printing of quality hardcopies of instructional materials.

System starts up.

Laboratory rules and regulations

- Handle every computer device with maximum care without dropping them down.
- Do not allow external diskettes, flash disks and other external storage devices. These may have viruses.
- Do not expose computers to dusty environments, dump places and strong heat.
- Do not expose computers to direct sunlight.

- You should move with a lot of care when you are in the lab. Never enter the lab while running.
- Call the lab technician or any experienced person in case you encounter any problem when you are using the computer.
- Avoid disconnecting the parts of the computer unless you have been told to do so.
- Always report any case of theft within the lab to the concerned authorities.
- Do not eat or drink anything near computers. Liquid can splash on the machines and spoil them.
- Avoid abrupt on and off of computers to avoid damage. Always shut them down through the right procedure.
- Cover the hardware devices after they have been cooled down.
- Always clean the surface of the hardware with a clean, dry piece of cloth. Avoid using water.
- Always follow instructions of the instructors while in the computer lab.

UNEБ 2015 Qn3. (a) Differentiate between computer servicing and computer repair. (2 marks)

Computer serving is the practice of keeping computers in a good working state. It usually involves cleaning of hardware components, scheduling of backups etc

While

Compute repair is the act of restoring computer hardware and software to good condition or working order

b) Write one reason for having the following items in the computer laboratory

- i. **Woolen carpet (01 mark)**
 - Improved safety. It prevents slipping and falling
 - Better insulation
- ii. **Blower (01 mark)**
 - The blower is used for dusting computer components.
- iii. **CCTV cameras (01 mark)**
 - CCTV cameras are used for surveillance in areas that may need monitoring.

Computer maintenance and management

- ❖ Switch on the computer hardware systems starting from the wall socket switch, U.P.S or stabilizer, computer and then the computer.
- ❖ Protect the computers with U.P.S or a Stabilizer.
- ❖ Avoid making connections (e.g. Mouse, Monitor) when the computer is on power.
- ❖ Minimize the number of visitors to your computer lab.
- ❖ Computers should be regularly serviced e.g. blowing the dust from the system, cleaning the keyboard etc.
- ❖ Storage devices should be kept safely as recommended by the manufacturers.
- ❖ The computer lab must be well ventilated to avoid computers from being affected by heat.
- ❖ The computer lab must be painted with water color paint to avoid problems of fire out breaks.
- ❖ There must be a fire extinguisher in the computer lab in case of fire outbreaks.
- ❖ Keep daily record of the condition of the computers.
- ❖ Only allow qualified personnel to clean the inside of the computer.
- ❖ Always clean the surface of the hardware with a clean, dry piece of cloth. Avoid using water.

UNEB 2013Qn 11 (b) Give any two measures to ensure that computers in a laboratory are safe? (02 marks)

- ☞ Putting up laboratory rules and enforcing these rules.
- ☞ Burglar proofing the laboratory room
- ☞ Providing stable power supply
- ☞ Installing fire prevention and control equipment
- ☞ Setting up a spacious Laboratory room

UNEB 2016 Qn2 (a) Explain the importance of servicing and maintenance of computers (02 marks)

To prolong the life time of the hardware

- ☞ To pre-empt problems that may render the proper performance of the computer system

- ☞ To update outdated software programs such as antivirus
- ☞ To repair computer components with mechanical faults.
- ☞ To schedule backups
- ☞ To create restore points which lets you roll back a system's configuration to a previous state.

(b) Suggest any three activities involved in servicing and maintenance of computers (03 marks)

- ❖ Cleaning of computer hardware equipment
- ❖ Repair of computer components with mechanical faults
- ❖ Upgrading or updating outdated software
- ❖ Scheduling backups

HEALTH AND SAFETY

There are a number of safety hazards linked with using computers and ICT devices. This section looks into some of these potential hazards and what you can do to prevent them. We will also look at some of the medical conditions and health problems that prolonged use of ICT devices can cause and what you can do to avoid them.

Health problems

There are a number of health problems that you can suffer if you use ICT devices incorrectly or for too long

The main ones are:

- ★ Repetitive Strain Injury (RSI)
- ★ Back and Neck Strain
- ★ Eye Strain and Headaches

Health Problem & Description	Causes	Prevention
(a) Repetitive strain inquiry	✓ Typing on a computer for too long.	✓ Take breaks to rest your hands.

<p>RSI causes painful swelling of the wrist and fingers</p> <p>Sufferers with really bad RSI are unable to use their hands at all.</p> <p>RSI is caused by doing the same small movements over and over again across a long period of time.</p> <p>For example, clicking a mouse button repeatedly</p>	<ul style="list-style-type: none"> ✓ Using a mouse for long periods. ✓ Holding the mouse Incorrectly. ✓ Working in a ramped workspace 	<ul style="list-style-type: none"> ✓ Use an ergonomic Keyboard. ✓ Arrange your workspace so you are not cramped. ✓ Use a wrist rest.
<p>(b) Back and Neck Problems</p> <p>Back ache and neck ache can cause great pain and affect the quality of your life.</p> <p>Both back and neck ache can be caused by sitting</p>	<ul style="list-style-type: none"> ❖ Working in a cramped workspace. ❖ Not sitting upright in your chair. ❖ Incorrect positioning of the computer screen. 	<ul style="list-style-type: none"> ▪ Take regular breaks to stretch your body. ▪ Use adjustable chairs so you can sit in a position suitable for your height. ▪ Sit upright against the back rest. ▪ Tilt the computer screen so it is set just below your

<p>incorrectly and using poor quality chairs without back rests. This is called poor posture</p>		<p>eye level.</p> <ul style="list-style-type: none"> ▪ Keep your feet flat on the floor.
<p>(c) Eye strain and headache Staring at a computer screen for too long can strain your eyes and cause headaches. Eye strain can cause your Vision to blur. Common causes of eye strain are screen flicker and having Direct light causing screen glare </p>	<ul style="list-style-type: none"> ★ Staring at a computer Screen for a long time. ★ Working in a room with bad lighting. ★ Using a computer screen with glare or flickers. ★ Dirt on the screen. 	<ul style="list-style-type: none"> ★ Use LCD screens rather than CRT as they have less flicker. ★ Use an anti-glare screen. ★ Ensure that room lighting is good with no direct light causing glare on the screen. ★ Keep the screen clean of dirt.

UNEB 2013 Qn2 (b) State one health risk associated with continued usage of computers (01 mark)

- ☞ Causes headache
- ☞ Back aches. Neck pain
- ☞ Sight problems/eye strains/ dry eyes
- ☞ Causes strain on fingers
- ☞ Brings about fatigue
- ☞ EMI Radiations causes genetic mutation
- ☞ Dirty Keyboards brings about germs

UNEB 2014 Qn2 (a) Give one reason why a school director would purchase the following equipment for a computer laboratory:

a. **Blower** (01 mark)

A blower is used in the computer laboratory to blow dust out of a computer components.

b. **Anti-glare filter screens** (02 marks)

A monitor screen treated to reduce glare from light sources which is used to protect the eyes from strains by reducing the radiations from the monitor.

c. **Air conditioner** (02 marks)

This is a system used to control the humidity, ventilation, and temperature in a laboratory and also maintains a cool atmosphere in warm conditions.

Safety Issues

There are a number of safety issues that can arise from using ICT devices.

Some of these safety issues include:

- Electrocution
- Tripping over wires
- Heavy equipment falling on you

Safety issue& Description	Causes	Prevention
<p>a) Electrocution Most ICT devices require an electrical power source. Whenever you have electrical power sources you run the risk of the electrocution.</p>	<ul style="list-style-type: none"> • Faulty equipment (bare wires etc). • Spilling drinks over electrical equipment. • Opening up an electrical device when you don't know what you're doing. 	<ul style="list-style-type: none"> • Make sure wires are insulated. • Keep drinks away from equipment. • Report any malfunctioning equipment to a technician. • Never open up an electrical device.
<p>b) Tripping over wires and cables ICT devices with wires can make a room a potential hazard. Trailing wires are easy to trip over if they are not secured or tucked away.</p>	<ul style="list-style-type: none"> • Long wires spread across a floor. 	<ul style="list-style-type: none"> • Hide wires in cable ducts (Trunkings). • Tuck trailing wires under desks or carpets. • Use wireless technology to eliminate the use of wires altogether.
<p>c) Heavy equipment falling on you Some ICT devices (like computer screens) are fairly heavy and can cause injury if they fall on you. Equipment should be positioned securely on strong desks and tables well away from the edge.</p>	<ul style="list-style-type: none"> • Equipment not positioned securely onto desks. • Poor quality and flimsy desks. 	<ul style="list-style-type: none"> • Make sure that equipment is positioned away from the edge of desks. • Use strong desks/tables that can support the weight with ease.
<p>d) Fires ICT devices require power from a mains outlet. If too many devices are plugged into a single mains at the same time it is possible to overload the circuit and start an electrical fire.</p>	<ul style="list-style-type: none"> • Too many devices plugged into a single mains outlet. • Leaving devices plugged in unattended for long periods. • Covering air vents on devices like laptops. 	<ul style="list-style-type: none"> • Make sure that your room has plenty of power outlets (sockets). • Don't plug too many devices into the same outlet. • Turn off and unplug devices if you are going to be away for a long time. • Have a CO₂ fire extinguisher in the room. • Leave air vents on devices uncovered

UNEBC 2014 Qn 10 a) Suggest one way in which computers have been made user-friendly for persons that are physically challenged in the following areas.

(i) Without hands. (01 mark)

Use of voice in recognition technology as input

(ii) Impaired vision. (01 mark)

- ☞ Use of voice recognition technology as input
- ☞ Use of projectors
- ☞ Use of magnifiers to enlarge output on a screen
- ☞ Use of braille keyboard by the blind

b) Give three healthy issues that may be caused by the prolonged use of computers. (03 marks)

- ✓ Headache
- ✓ RSI fingers
- ✓ RSI wrist pain
- ✓ Painful eyes/sight problems/eye strain
- ✓ Fatigue
- ✓ Germs from dirty keyboard

Chapter questions

1(a) Define computer laboratory (01 mark)

(b) Briefly explain any four areas of laboratory security (04 marks)

2(a) clearly show the difference between safety precautions and safety practices as applied to a computer laboratory (02 marks)

(b) State three ways to ensure safety of computers in the laboratory (03 marks)

3(a) computers need to be connected to a UPS always when in use. Give two reasons for connecting computers to a UPS (02 marks)

(b) State three reasons why a user will be required to restart a computer (03 marks)

4(a) explain the importance of having the following in a computer laboratory (05 marks)

- (i) Wool carpet
- (ii) Air conditioner
- (iii) Blower
- (iv) Antiglare screens

(v) Burglar proofs

5(a) state any possible dangers of shutting down a computer improperly (01 mark)

(b) List three causes of data loss in a computer (03 marks)

(c) State any precautions to ensure safety against data loss on a computer (01 mark)

6 Explain five behaviors that must be avoided while in the computer laboratory (05 marks)

7list some factors to consider before setting up a computer laboratory (05 marks)

8 peter a university graduate realized that his computer was not functioning properly. The technician told him that he would troubleshoot the computer.

(a) What is meant by the term troubleshooting(02 marks)

(b) Outline the steps involved in the trouble shooting process(03 marks)

9(a) Explain the term formatting as applied to the laboratory environment (02 marks)

(b) State any three circumstances that usually requires one to format a disk (03 marks)

10(a) Give reasons why computers should be regularly serviced (03 marks)

(b) State any two preventive measures taken during the cleaning process of computers (02 marks)

11(a) Explain the meaning of the term configuration (02 marks)

(b) James bought a new computers for the school's computer laboratory. Mention three items which must be installed before computers can become useable (03 marks)

12(a) identify two possible causes of system freezing (02 marks)

(b) Mention three ways of keeping files in a system secure (03 marks)

13(a) The laboratory attendant of Katwe primary school is stack with his slow computers and other security threats, As an ICT student suggest how the attendant can;

(i) improve the speed and general performance of the computers (03 marks)

(ii) Reduce risks/threats in the computer laboratory (02 marks)

14 (a) mention three reasons why people prefer to use laptops than desktop computers (03 marks)

(b) what causes keyboard failure (02 marks)

COMPUTER

WORD PROCESSING

Chapter contents

Introduction

Features of a word processor

Advantages of word processing

Chapter questions

Introduction

The history of written communication is very long. It goes all the way back to ancient Egypt, when people painstakingly chiseled the hard surfaces of stones to record the details of their commerce and the facts of their daily lives. We have seen an expression dating back to those times: “carved in stone” means that something is set, recorded, meant to last through the ages. Indeed Egyptians’ toil left us a clear picture of their lives but at a tremendous cost.

In order to minimize and eliminate such hassles, several electronic devices and services by computerized systems and electronic typewriters have been developed for more efficiency and effectiveness in document production.

Computerized word processing systems have got easy to use document edit and format features capable of making documents look more and more business like if well mastered. Some people and organizations earn their living by producing documents for others using computerized systems.

Word processing has continued to evolve since the days of the first word processors. Today, there are hundreds of word processing software programs available, for a wide variety of purposes.

Objective

At the end of this topic, learners should be able to demonstrate basic knowledge and skills in document production.

Pre requisite

A learner should have prior knowledge concerning switching on the computer. A clear picture of how to boot a computer can help learners understand this topic well.

Definitions:

Word processing:

This is the process of creating text based documents such as reports, letters, brochures, memos, mailing labels and newsletters.

Word processor

This is software used to create, edit, format, save and print text based documents.

Examples of word processing software

MS Word, AbiWord, openoffice.org writer, La Tex editor and LyX.

UNEBC 2015Qn 4 (b) A student is typing a document using Microsoft word. Write down three steps the student will use to shut down computer.

- ✓ Save the document by pressing Ctrl+S
- ✓ Close the saved document, by clicking on the close button in MS word window
- ✓ Click the start button, choose shutdown

2. FEATURES OF A WORD PROCESSOR;

Editing It is the process of making changes to the existing content of a document

Formatting It is the process of making changes to the appearance of a document.

Saving

It is the process of transferring data / information from memory to a storage medium such as a floppy disk or a hard disk.

Undo

Is the operation that allows actions that have been performed to be reversed such that if some text was accidentally deleted, then the action can be undone.

Printing

Printing Is the process of sending a file to a printer to generate output on medium such as paper.

Inserting Is the process of adding text or graphics to a document.

Deleting Is the process of erasing text or graphics from a document.

Cutting Is the process of removing the original text from its original position onto the clipboard

Copying Is the process of duplicating and storing text on the clipboard.

NB; when text is cut, the original text is removed from its place while when text is copied, the original text remains in its original place.

Pasting Is the process of removing the text from the clipboard into the document.

Word wrap

This is an MS word feature which allows a user to type continually without pressing the enter key at the end of each line.

Find and Search

This feature allows the user to locate all occurrences of a particular character, word or phrase.

Replace

Allows a user to substitute existing characters, words or phrases with new ones

Spelling checker

Allows a user to check the spelling of a whole document at one time or check and correct the spelling of individual words as they are typed (Autocorrect).

Grammar checker

It helps to report grammatical errors and suggests ways to correct them.

Character map

Is a group of symbols not found on the keyboard.

Thesaurus

Helps to suggest alternative words with the same meaning (synonyms) for use in the document.

Mail Merge

Create form letters, mailing labels, and envelopes.

Used when similar letters have to be sent to several people.

The names and addresses of each person can be merged with one single standard document and then printed out.

Automatic page numbering

Numbers the pages automatically in a document

Tables

This is an MS Word feature which allows a user to organize information into rows and columns.

Multi columns Arranges text in two or more columns that look similar to a newspaper or magazine.

Macros

Allows a user to record or save frequently used keystrokes and instructions which can be executed later by running the corresponding macros.

Foot notes and endnotes

- You might use footnotes for detailed comments and endnotes for citation of sources.

Headers;

A header is the area in the top margin of each page where text can be entered.

Footers;

Footer is the area ion the bottom margin off each page where text can be entered.

UNEБ 2016 Qn 18 Choose the correct terms to complete the statements (a)-(e)

Rename	Cursor	
Bookmark	Watermark	Pointer
Merge	Mail merge	Indent

- (i) A background feature in a document is referred to as watermark
- (ii) The feature that allows duplication of a document with unique addresses is mail merge
- (iii) The feature that starts a line of text further from the margin is indent
- (iv) The feature that assigns a name to a specific point in a document is called bookmark
- (v) A symbol on the screen that indicates an insertion point in a document is a pointer

Advantages of word processing software over the ordinary typewriter.

- ❖ Easy and fast to make changes to the document.
- ❖ Has many features to create documents that look professional and visual appealing.
- ❖ Documents can be previewed before being printed.
- ❖ Documents can be saved for future reference and editing.
- ❖ It is convenient in making letters and mailing labels.
- ❖ It is possible to move blocks of text to different positions in the same document.
- ❖ One can insert and delete lines of text.
- ❖ The layout of the document can be altered before printing.
- ❖ All typing mistakes can be corrected.
- ❖ The document can be printed many times.
- ❖ Text can be added to a document without having to type it again.
- ❖ It can be used to mail documents unlike the ordinary typewriter.
- ❖ It can create graphics such as shapes, frames etc.
- ❖ It can be used to create web pages.

- ❖ One can easily count the words in the document using the word count feature.
- ❖ It allows automatic insertion of footnotes and endnotes.

COMPUTER

HARDWARE

Chapter contents

Input devices

Output devices

Storage devices

Processing devices

Chapter questions

The information you need from a computer system to make decisions is produced by data processing activity. Software control data processing and dictates how and where data is stored and output.

However, none of this activity can occur without hardware. In this topic we shall cover the computer hardware basics for input, processing, storage, and output.

Objectives

You should be able to;

Describe the functions of the four basic hardware components of a computer system, identify the most widely used input devices, distinguish and between RAM and ROM

Pre requisites

You should have the basic knowledge of introduction to computing.

Definition.

The term computer hardware refers to the physical components of the computer. Hardware means the components of a computer which can be simply touched.

Note: Motherboard. This is the main circuit board of a computer, located inside the system unit, to which all computer components connect.

UNEБ 2016 Qn 10 (a) Define the term motherboard (02 marks)

This is a thin, flat piece of circuit board that interconnects all other components of a computer together. It is sometimes referred to as the nerve center or backbone of the computer

(b) Identify any three components housed on the motherboard (03 marks)

- ✓ Central processing unit
- ✓ Heat sink
- ✓ BIOS chip
- ✓ RAM chip
- ✓ ROM chips
- ✓ Sockets

UNEБ 2013 Qn6 (a) Give one use for each of the following computer devices.

(i) Power supply unit. (01 mark)

This converts AC to DC which is normally used by the internal components of the computer

(ii) System Case (01 mark)

This is a case which encloses the internal components of the computer. It protects the internal components of a computer.

(iii) CMOS battery (01 mark)

This helps to keep the date, time, set when computer is switched off.

(b) Explain the following:

(i) Analog device.

This is a device that measures, records or reproduces data in a continuous form

(ii) Digital device. (02 mark)

This is a device that receives data and information in digital digits of 0s and 1s.

Hardware is categorized as input devices, output devices, storage and processing devices.

1. INPUT DEVICES

An input device is any hardware component that can be used to enter data and instructions into a computer.

Examples of Input Devices

- Keyboard
- Mouse
- Scanner
- Touch pad
- Joystick

- Microphone
- Webcam
- Light pen
- Voice recognition device
- Optical mark recognition reader
- Bar code reader

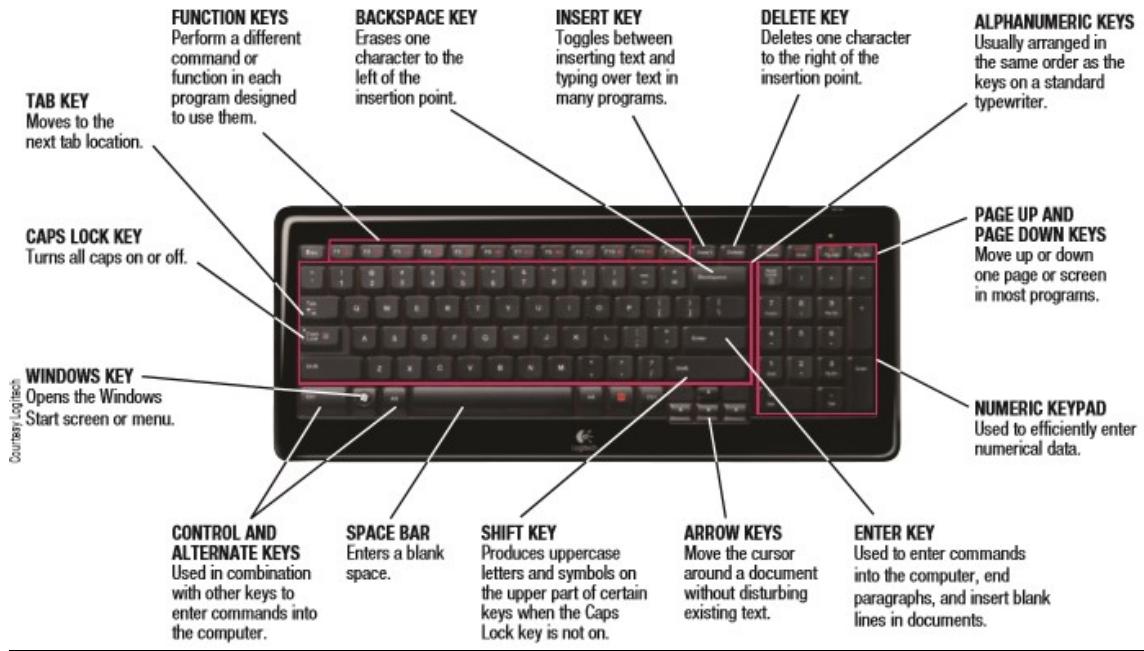
UNEБ 2017 Qn 13 The table below consists of some of the peripheral devices of a computer. Indicate input or output

PERIPHERAL DEVICES	INPUT/OUTPUT
Biometric Reader	
Projector	
Plotter	
Scanner	
headphones	

Keyboard

Keyboard. An input device containing numerous keys that can be used to input letters, numbers, and other symbols.

Most computers today are designed to be used with a keyboard—a device used to enter characters at the location on the screen marked by the insertion point or cursor (typically a blinking vertical line). Keyboards can be built into a device, attached by inserting the keyboard's wired cable or wireless receiver into a USB port, or connected via a wireless networking connection



Advantages of using a mouse

- ★ A mouse is user friendly for computer beginners.
- ★ A mouse is easy and convenient to use with a graphical user interface.
- ★ Using a mouse to select items or move to a particular position on the screen is faster than using a keyboard.
- ★ A mouse can be operated by one hand.



Disadvantages of using a mouse.

- It is not easy and convenient to input text with a mouse.
- Issuing commands with a mouse is slower than by using a keyboard.
- It needs some practice in order to control a mouse properly.
- A mouse is not accurate enough for drawings that require high precision.
- A mouse usually requires a flat surface to operate.

- A mouse needs more desk space to operate when compared with a trackball or a touchpad.

Problems that affect the proper functioning of a mouse.

- Dirt disrupts motion of ball.
- Nature of the roll surface.

Ways through which mouse can be protected from the above problems

- Cleaning the ball and rollers regularly.
- Providing the correct roll surface or a mouse pad.
- Avoid mouse falling or hanging on the chord by tying twists on both the mouse and keyboard cables
-

3. Track ball

This is another pointing device that functions like a mouse. A track ball has a movable ball on top of a stationary device that is rotated with finger or palm of a hand. A track ball is built into the keyboard especially on some portable devices like laptop, phones etc.



4. Touch pad

A touch pad is a flat rectangular device that has weak electric fields to sense the touch as the user moves the finger tips. It used to control the pointer with a finger. The cursor follows the movement of the finger on the pad. You can click by tapping the pad surface.



5. Joystick



This is a pointing device that consists of a vertical handle which looks like a gear shift lever mounted on a base with two buttons. It mainly used in video games in some computer aided design system and in accomplished robot system.

6. Light pen



This is a pointing device that can detect the presence of light. These are used in high technological designs. They have a beam of light that is radiated into different parts of a specialized screen to input data. These beams of light are very small and sharp and therefore much precise. They are used in the designing of integrated circuits (ics), also used by health care professionals e.g. doctors and dentists work.

7. Touch screens



Touch screen is an electronic visual display that can detect the presence and location of a touch within the display area. The term generally refers to touch or contact to the display of the device by a finger or hand. Touch screens can also sense other passive objects, such as a pen.

Areas where touch screens are used

- ★ Touch screens are often used for information kiosks located in department.
- ★ Touch screens are also used for ATM machines to allow easy access of bank accounts.
- ★ Touch screens are also used in some places like stores, hotels, air ports, museums.

Advantages of touch screen

- ✓ No extra peripherals are needed except the monitor.
- ✓ touch screen allows easy access commands, which are usually identified by words or symbols on the screen

8. Digitizer:



This looks like the mouse except that it has a glass with a cross hair in the middle. The cross hair acts as a guide during the input of data. It is used in conjunction with a digitizing tablet. It is mainly used in cartography (map making and architectural drawing to accurately trace the outlines on a map.

Scanning input devices

These are hardware that capture images of hard copy and converts them into a digital form for a computer processing.



Examples of scanning input devices

10. Optical scanners

This is a device that can read text or illustrations printed on paper and translate the information into a form the computer can use (digital form). It uses a laser beam and reflected light to translate hard copy image of text, drawings, and photos into the computer in a digital form. The image can then be processed into the computer, displayed on the monitor and then stored on the storage devices like a flash disk.

8. barcode reader

Barcodes are machine readable codes that represent data as a set of bars.



Barcode reader is a photo electric scanner that translates the barcode symbols into digital form of which the corresponding information about the items is relieved from store computer and printed out for a customer as a receipt.



9. Optical mark recognition reader (omr)

This is scanning technology that reads pencil marks and converts them to the computer. OMR readers are often used for making



multi choices, answer sheets; capturing data from questionnaires, interviewed environment forms, mark sheets etc

10. CCTV (closed-circuit television) camera

cctv cameras can produce images or recordings for surveillance purposes, and can be either video cameras, or digital stills cameras. marie van brittan brown was the inventor of the cctv camera.



11. Biometric scanners



Biometrics consists of methods for uniquely recognizing humans based upon one or more intrinsic physical or behavioral traits.

UNEB 2015 Qn. 14 (a) List any three input devices.(03 marks)

Keyboard, mouse, optical scanner, digital cameras, touchpad, track ball, joystick, light pen, barcode reader

(b) Given function of any two input devices listed in (a) above. (02 marks)

Keyboard. This contains keys that allow users to enter data and instructions into the computer

Mouse. For pointing at an item, clicking, dragging, highlighting, selecting an item or scrolling a bar

2. OUTPUT DEVICES

An output device is any hardware component that can display information to the user

Or

An output device is any hardware component that converts input into a form that is intelligible to end users. This can either be in visual, graphics, or audio

Examples of output devices

✍ monitor

✍ speaker

 projector

 printer

 plotter

 facsimile machine

Output is data that has been processed into information a usable form, called information

Storage devices act as input devices when they read and act as output devices when they write.

In details output devices include the following;

1. Display device (monitors & projectors)

These are devices which are used to display the computer output. Information on a display device is called a “**softcopy**” because it exists electronically.

i) Monitors

Monitors display images by lighting up the proper configurations of pixels (a pixel is the smallest colorable area in an electronic image, such as a scanned image, a digital photograph or image displayed on a display screen.)

There are two types/kinds of monitors which include;

- monochrome (one color) .in this each pixel can be one of the two colors, such as black and white)
- color monitors. These display a combination of three colors red, green and blue.

Advantages of using colored monitors

They make the screen display more attractive.

They can be used to highlight error messages and menu options.

Disadvantages of using colored monitors.

★ Screens with a lot of colors take longer time to process.

★ More money is required for colored display.

Categorizes of monitors (display devices)

- CRT (cathode ray tube) monitors.
- LCD (liquid crystal display) monitors. Uses charged liquid crystals located between two sheets of clear material to light up the appropriate pixels to form the image on the screen.
- plasma

CRT (cathode ray tube) monitors.

These works like a standard television, a CRT monitor is made of small picture elements called pixels. It grows at varying intensities to produce colored images.

Advantages of CRT monitors

- They can produce fast and reach color sights.
- They can be viewed from a very wide angle.
- They are cheaper than LCD monitors.



Disadvantages of CRT monitors

- They emit more emr (electromagnetic radiations) than LCD monitors.
- They consume more electricity than LCD monitors.
- They occupy more space.

LCD (liquid crystal display)

LCD of flat panel screen use liquid and crystals to create images on the screen normally used on portable computers such as laptops, digital watches, calculators, phones e.t.c



Advantage of LCD monitors

- They consume less power.
- They occupy less space.

★ The radiation emitted is negligible.

★ They are portable

UNEB 2013 Qn13. (a) An Internet cafe plans to replace Cathode Ray Tube (CRT) monitors with Liquid Crystal Display (LCD) monitors. Why should the cafe replace CRTs with LCDs? (05 marks)

- ★ They consume less power.
- ★ They occupy less space.
- ★ The radiation emitted is negligible.
- ★ They are portable
- ★ They are readily available on the market
- ★ They are easily mounted on the walls.

UNEB 2017 Qn 7(a) Define the term hardware as used in ICT (02 marks)

(b) Name two ports used to connect devices on a computer (02 marks)

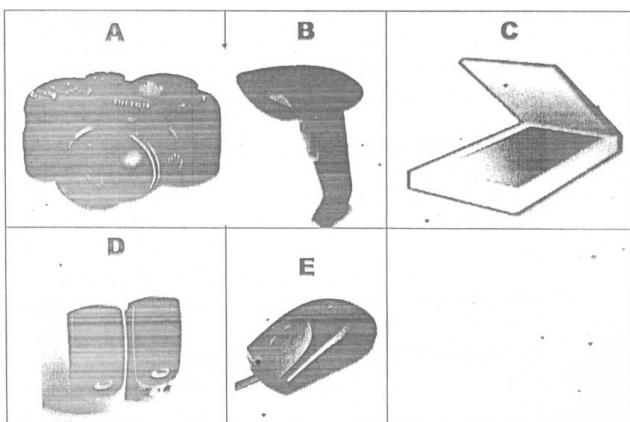
(c) Give one device that can be used to transfer a hardcopy document to a computer (01 mark)

Disadvantages of LCD monitors

❖ usually more expensive

❖ can only be viewed from a narrow angle

UNEB 2014 Qn 4 Study the devices below and answer the questions that follow.



a) Name the devices labelled. (03 marks)

A digital camera

B Barcode reader

C scanner

b) Give one major similarity between devices A and E. (01 mark)

They are both input devices

c) Identify one device which can be categorized as an output device.

(01 mark)

Device D or Projector

Printers

A printer is an output device that produces texts and graphics on a physical medium such as paper. The printer information output on a physical medium is called **hardcopy** which is more permanent than screen display (**softcopy**)

The classification of printers

Printers are classified into two:

- Impact printers
- Non-impact printers.

Impact printers

These are printers that produce a hard copy output with the print mechanism/heads physically touching the print media.

Print media include;

- ★ papers
- ★ transparencies
- ★ cloth

Examples of impact printers include;

- ✍ dot matrix printers
- ✍ daisy wheel printers
- ✍ Ball printer printers.

Non-impact printer

Non-impact printers are those printers that produce a hard copy output without the print head touching the printing surface.

They use techniques such as ink spray, heat, xerography or laser to form printed copy.

Examples of non-impact printer are;

- ★ Laser printer.
- ★ Inkjet printer.
- ★ Thermal printer.

Plotter

A plotter is a sophisticated printer used to produce high quality drawings that can be quite large (e.g. width up to 60 inches)

Advantages of plotter

information produced is permanent

Disadvantages of plotter

- ★ The time to get the print output is slow when compared with display devices
- ★ Paper is wastage for obtaining output
- ★ They are generally noisier than display devices

Common factors consider while buying a printer

page per minute print output

memory of at least two mega bytes

price of the cartridge or toner

availability of the toner or cartridge

purpose for which the printer is going to be put to use

Printer drivers. Most printer drivers are installed on a computer in order to enable the printer to communicate with a computer and can carry out printing.

Facsimile \fax machine

This is advice that transmits and receives documents on telephone lines. Documents sent or received via fax machines are known as faxes.

A fax modem is a communication device that allows a user to store received electronic documents as fax.

Multifunction machine

This is a single piece of equipment that provides the functioning of printer, screen, photo coping machines and fax mail

Advantages

- ✓ a multi functioning device takes up less space than having a separate printer, scanner , copy machines and fax machines
- ✓ it is also significantly less expensive than purchasing each device separately

Disadvantages

- ★ if a malfunctioning machine breaks down it loses all its functions

Terminal

A terminal is a device with a monitor and key board. The term terminal can also refer to any device that sends and receives computer data.

Kinds of terminals include; -

1. Dumb terminal

It has no processing power and cannot act as a standalone computer and must be connected to server to operate.

2. Intelligent terminal

It has memory and processor so it can perform some functions independent of host computer.

UNEB 2016 Qn.6 (a) what is an output device?(02 marks)

They are pieces of computer hardware equipment used to communicate the results of data processing by the CPU to the outside world.

(b) Give the two categories of printers and an example in each case:

(i) Category impact printers

Example..... dot matrix printers, line printers, daisy wheel printers

(ii)) Category non-impact printers

Example..... inkjet printers, laser jet printers

3. COMPUTER STORAGE DEVICES

Storage refers to a media on which data, instructions and information are kept.

Storage devices

These are physical materials on which a computer keeps data, instructions for later retrieval or for future references.

Note:

Storage medium this is the physical material where data is stored.

Storage device. A piece of hardware, such as DVD drive, into which a storage medium is inserted to be read from or written to.

Units of data

Bit	Bit refers to binary digit which is the basic unit of data. bit is represented by either 0s or 1s
-----	---

byte	one consists of 8 bits e.g. 011100010
word	one word consists of at least 16 bits or 2 bytes

A computer word is the amount of data (typically measured in bits/bytes) that a CPU can manipulate at one time.

UNEBC 2013 Qn 1 The table below shows specifications of two computers X and Y.

Computer Specifications	Computer X	Computer Y
Processor	Intel(R) 3.2 GHz	Intel(R) 3308 MHz
RAM	1 GB	2000 MB
Hard disk	4600 MB	50 GB
Monitor Size	19"	15"

(i) Which of the two computers would you recommend for a company to buy? (01 mark)

Computer Y

(ii) State two reasons to defend your answer in (a). (02 marks)

Computer Y has more RAM compared to computer X

Computer Y has more hard disk space compared to Computer X

Computer Y has a faster processor compared to computer X

(iii) Which is the least important of the computer specifications given in the table?

(01 mark)

Monitor size

(iv) State one reason defending your answer in (c). (01 mark)

The monitor size does not affect the exact processing and storage of data

Types of storage devices

There are two types of storage devices namely primary storage devices, secondary storage devices

Primary storage devices

Primary storage is the main memory which is also referred to as the internal memory.

This is a type of memory/ storage on a computer which can immediately be accessed by the computer's CPU.

The primary memory is divided into two namely;

- ★ RAM (random access memory)
- ★ ROM (read only memory)

RAM (random access memory)

Ram is the working area during the processing of data. The data and instructions are temporally held in ram during processing and after processing and it disappears when you turn off the power of computer hence ram is volatile.



ROM(read only memory)

It is a set of chips that contains instructions to help a computer prepare for processing tasks. The instructions in ROM are permanent and you have no way to change them, short of removing the ROM chips from the main board and replacing them with another set. You may wonder why the computer includes chips with programs permanently stored in them. Why not use more versatile RAM?



The answer is that when you turn on your computer, the processor receives electric power and is ready to begin executing instructions. But because the computer was just turned on, RAM is empty—it doesn't contain any instructions for the processor to execute. Even though programs are available on the hard disk, the processor doesn't have any instructions to tell it how to access the hard drive and load a program.

ROM chips

It is also called firm ware which is a term used for software permanently stored on a chip.

ROM chips in microcomputer contain instructions used to transfer information between keyboard, screen, printer, and other peripherals and the processor. These instructions are called **ROM BIOS** (basic input output system)

There are three rom chips used in a special situation

PROM – programmable read only memory.

It is a blank chip on which the user/buyer can write a program on it with special equipment once is written it can't be modified or changed.

EPROM – erasable programmable read only memory

This is a chip or a content that can be written on it and erased once using special equipment.

EEPROM – electronically erasable programmable read only memory

These are rom chips that are designed to be modified by the user for more than one time.

Differences between RAM & ROM

ram (random access memory)	rom (read only memory)
1. it is volatile 2. it is temporary	it is non-volatile

3. it is read and write	it is permanent
4. it can be increased or changed or altered	it is read only it is normally not increased or changed or altered

Note: **Volatile** means that it is not permanent and can be changed. It needs power supply to keep the data stored in it

Reading

This refers to the process of accessing information from a secondary storage media / device.

or

It is the process of transferring information from storage media to memory (ram)

Writing: this is the process of transferring information / data to secondary storage

UNEB 2016 Qn.4 Describe the following terms as used in ICT.

a) system unit

This is an enclosure also referred to as the computer chassis, housing, cabinet that contains most of the internal components of a computer.

b) RAM chip

This is the temporary storage for data and programs that are being accessed by the CPU.

c) Power supply

This provides the necessary electrical power to make the PC operate

The power supply converts the Ac power from the wall outlet into DC power, which is required by all internal parts of a computer.

d) Bus

These are paths or electrical tunnels that transfer data between components on the motherboard.

They are a collection of wires connecting different devices on the motherboard.

e) Peripheral devices

These are external device attached to the system unit e.g monitor, disk drives

Secondary storage.

This is also known as auxiliary storage which is designed to retain data and instructions and programs in a relatively permanent form.

UNEBC 2017 Qn 9(a) Distinguish between reading and writing in relation to storage medium (02 marks)

(b) Mention one example for each of the types of storage devices given below (03 marks)

(i) Optical storage

(ii) Magnetic storage

(iii) Solid state

There are two main types of secondary storage.

✍ Magnetic storage devices.

✍ Optical storage devices.

Examples of storage devices

- ✓ Floppy disks.
- ✓ Hard disks.
- ✓ Magnetic tapes.
- ✓ Flash memory.
- ✓ Punched cards.
- ✓ Zip disk.
- ✓ iPod.
- ✓ Compact disks.

UNEBC 2014 18 (a) State one difference between a computer disc (CD) and a Digital Versatile Disc (DVD).

(01 mark)

DVD has high capacity than CD

b) Explain the circumstance under which the following storage devices are used.

i) Memory card (02 marks)

Memory cards can be used when information shall be accessed by mobile devices such as phones

ii) Flash disk (02 marks)

flash disks may be used if the data shall always be accessed by the computers.

NOTE: The performance of the hard disk depends on the following factors.

1. Seek Time: Seek time is the time required to move a read/write head to a particular cylinder or track.

2. Rotational Latency or delay: This is the time required to reach the head at the beginning of an appropriate sector. Once a cylinder or track is selected, the disk controller waits until the read/write head reaches the appropriate sector.

3. Transfer Time: Transfer time is the time required to transfer data, read data from the disk into main memory. Alternatively, it is the time required to write data on the disk from main memory.

4. Access Time: Access time is the sum of seek time, rotational delay and transfer time.

Mathematically it is written as;

Access time = Average Seek Time + Rotational Latency + Transfer Time

Once the read/write head is in position, the read or write operation is performed. Typically, a disk can transfer several megabytes of data per second. Therefore, the value of seek time and rotational latency is in milliseconds.

NOTE: Characteristics of secondary memory (storage).

These are magnetic and optical memories.

It is also known as back up memory.

- It is non-volatile memory.
 - Data is permanently stored even if power is switched off.
 - It is used for storage of data in the computer.
 - Computer may run without secondary memory.
- Slower than primary memories.

UNEBC 2013 Qn 5 (a). (a) Give three factors a company should consider before buying any storage (03 marks)

- ✓ The access time of the device should be considered.
- ✓ The size of the storage device should be large.
- ✓ The price of the device should be affordable.
- ✓ The durability should be considered.

(b) Teo's network access speed is six megabytes per second. How many kilobytes does Teo's network receive or send per second? (02 marks)

$$6 \text{mbps} = (6 \times 1024) \text{ kbps}$$

$$6 \times 1024 \text{ kbps}$$

Different types of secondary storage devices

there exists different types of secondary storage devices, each of them suitable for a different purpose. They mainly differ in the following aspects:

- Technology used to store data
- Capacity of data they can hold
- Size of storage device
- Portability of storage device and
- Access time to stored data.

Currently the most common forms of secondary storage device are:

Solid state.

Solid state storage devices have got no moving parts and data is stored and retrieved from them in a similar manner as it would be from computer memory.

Examples of solid state devices include; memory cards, flash disks

Optical Disks

Optical Medium: Optical medium is a non-volatile storage media that consists of a flat, round, portable disc made of metal and plastic that is written and read by a laser.

Magnetic Tapes.

Magnetic Medium: Magnetic Medium is a non-volatile storage medium. Magnetic disks use magnetic particles to store items such as data, instructions and information in disk's surface.

UNEBC 2015 Qn 1 (a) Distinguish between Random Access Memory (RAM) and Secondary storage. (04 marks)

RAM refers to a storage location where both data and instructions are temporarily held for immediate access and use by the computer's microprocessor

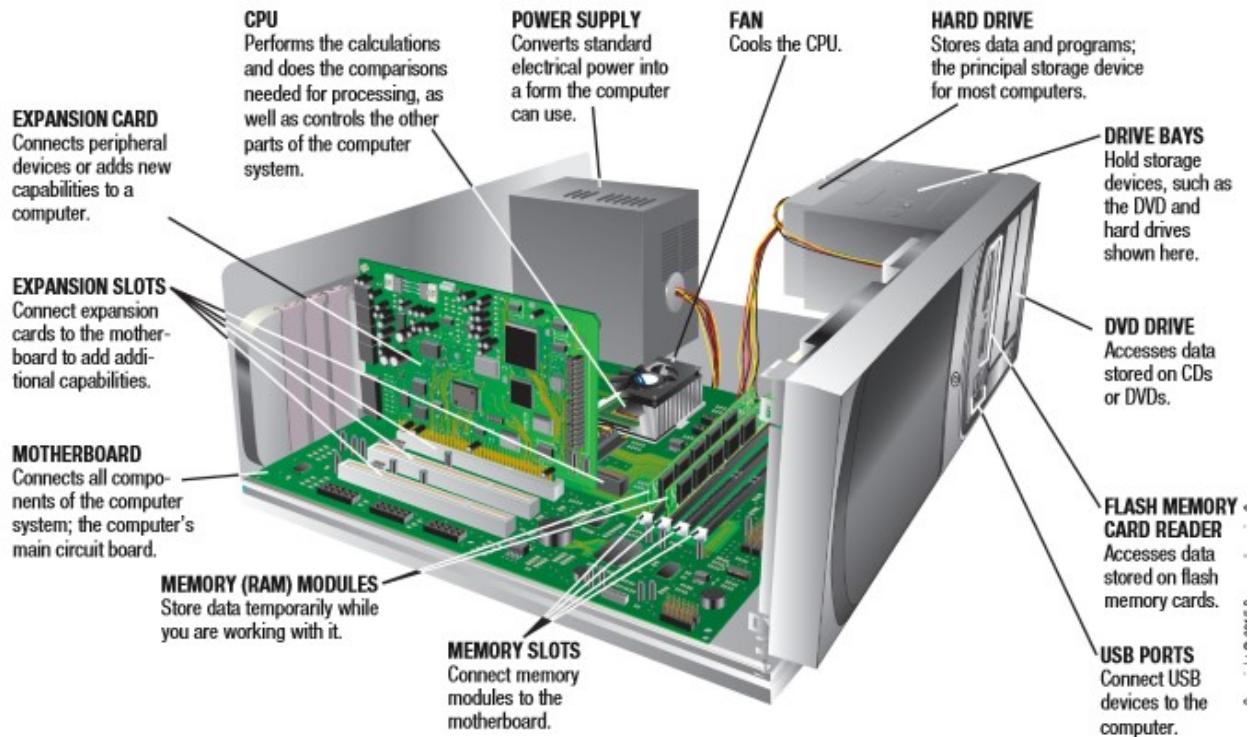
While

Secondary storage is any storage device assigned to retain data and instructions (programs) in a relatively permanent form.

b) Give an example of secondary storage (01 mark)

hard disk, magnetic tapes, flash disks, memory cards, CD-ROM, CD-RW

3. PROCESSOR COMPONENTS



A processor(CPU) consists of three main parts which include the following;

- ☞ control unit (cu)
- ☞ arithmetic logic unit (ALU)
- ☞ registers

Parts of the CPU

Control unit

This is a part of the CPU that tells the rest of the computer system how to carry out programs instruction, i.e. directs the movement of electronic signals between ram and input and output devices.

Arithmetic logic unit

It performs arithmetic operations e.g. addition, subtraction, multiplication and division and logic operation

Register/ memory unit.

Registers are temporary high speed storage area that holds data and instructions that are being used shortly by the computer.

System clock.

The system clock controls how fast all operations within a computer take place or how are performed and the operation Speeds are measured in MHz.

The speed at which a processor executes instructions is called **clock speed** or **clock rate**.

Each tick is called **clock cycle** and a CPU requires a fixed number of clock cycles to execute each instructions.

For every instruction, the control unit repeats a set of four basic operations called the machine cycle or **instruction cycle**.

UNEБ 2017 Qn 3 write the following in full as used to ICT (05 marks)

- (i) CCTV
- (ii) ROM
- (iii) CAD
- (iv) CPU
- (v) VDU

Most processors used by personal computers today support pipelining.

Pipelining: This is when the CPU begins executing a second instruction before first instruction is completed, and the result is faster processing. Most new processors can pipeline up to four instructions.

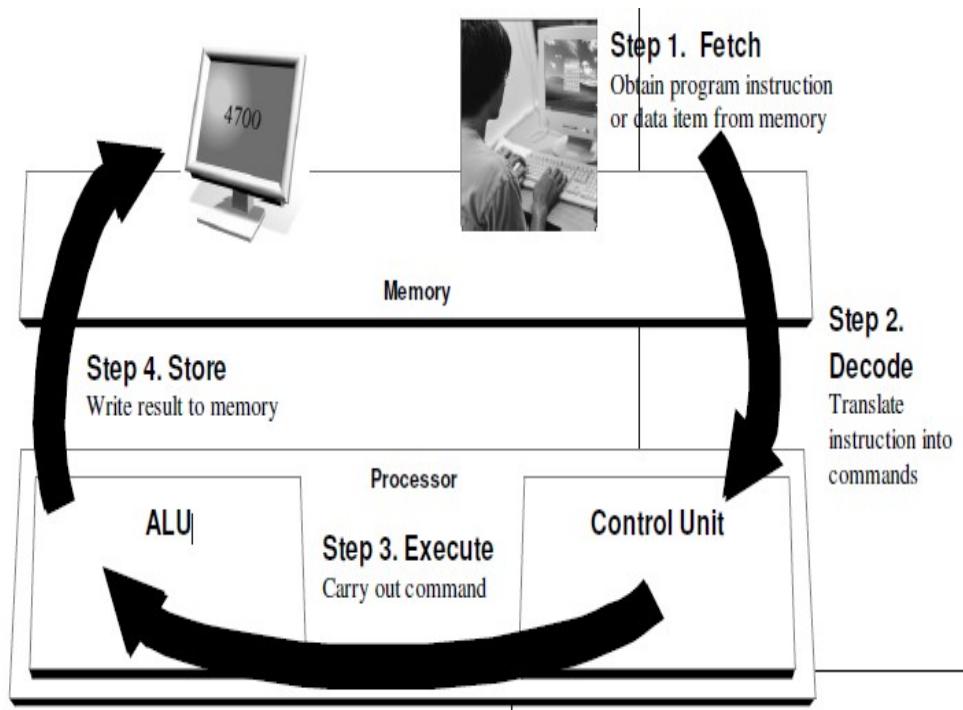
Superscalar CPUs have two or more pipelines that can process instructions simultaneously.

The basic operations of the **machine cycle** are:

- i) **Fetching**: It is the process of obtaining a program instruction or data item from memory. The time taken to fetch is called instruction time.
- ii) **Decoding** is the process of translating the instruction into commands that the computer understands.
- iii) **Executing** is the process of carrying out the commands.
- iv) **Storage**. Refers to keeping of information after processing.

Machine cycle / clock cycle / instruction cycle.

There are basically four operations of the CPU that comprises a machine cycle or clock cycle.



When the CPU begins fetching second instruction before completing machine cycle for first instruction, this processing is called **pipelining**.

Pipelining Results in faster processing.

UNEBC 2014 Qn 12 a) State any three operations of machines cycle of a central processing unit.

(02 marks)

- ✓ *Fetching*
- ✓ *Decoding*
- ✓ *Executing*
- ✓ *Storage*

b) Describe any one of the operations stated in (a) above.

(02 marks)

- ✓ **Fetching:** It is the process of obtaining a program instruction or data item from memory. The time taken to fetch is called instruction time.
- ✓ **Decoding** is the process of translating the instruction into commands that the computer understands.
- ✓ **Executing** is the process of carrying out the commands.
- ✓ **Storage.** Refers to keeping of information after processing.

Chapter questions

1(a) Distinguish between softcopy and hardcopy output (02 marks)

(b) Give three situations where a hardcopy is preferred compared to a soft copy (03 marks)

2(a) what is meant by computer hardware? (01 mark)

(b) State four major classification of computer hardware (04 marks)

3(a) Define the term input device? (01 mark)

(b) State four ways of inputting data into the computer, giving an example for each (04 marks)

4(a) Differentiate RAM from ROM (02 marks)

(b) List down any three factors that should be considered when purchasing a computer (03 marks)

5(a) state three devices that can be used as both input and output (03 marks)

(b) Mention any two practical uses of Light Emitting Diode(LED) on a printer (02 marks)

6 Peter went to buy a monitor to use on his computer. He preferred LCD monitors to CRT monitors

(a) State three advantages of LCDs over CRTs (03 marks)

(b) Mention two disadvantages of LCD technology as compared to CRT (02 marks)

7(a) Define the following terms as used in display devices (03 marks)

- i) Resolution
- ii) Refresh rate
- iii) Video card

(b) Outline any two factors to consider when choosing a monitor (02 marks)

8(a) state the difference between impact and non-impact printers (02 marks)

(b) Mention three advantages of non-impact printers over impact printers (03 marks)

9(a) Define the term multimedia as used in computing (02 marks)

(b) List three requirements of multimedia systems (03 marks)

10(a) what is meant by “dead tree edition” as used in computer hardware (01 mark)

(b) State one specialized application of each of these Hardware devices (04 marks)

(i) Light pen

(ii) Stylus and graphic tablet

(iii) Barcode reader

(iv) optical character Recognition (OCR) Reader

11 Define the following terms as applied to computer hardware (05 marks)

- (i) cache memory
- (ii) serial port
- (iii) peripheral device
- (iv) primary memory
- (v) secondary memory

12 State the use of each of the following memory (05 marks)

(i) Cache memory

(ii) Firmware

(vi) Buffer

(vii) CMOS

(viii) Virtual memory

13 (a) Define the term machine cycle? (01 marks)

(b) Briefly describe each of these operations of the machine cycle (04 marks)

(i) Fetching

(ii) Decoding

(iii) Executing

(iv) Storage

COMPUTER

SOFTWARE

Chapter contents

Introduction

System software

Application software

Chapter questions

Introduction

The first question a prospective employer may ask is, "do you know anything about computers?" the second question may well be "what kind of software are you familiar with?" this topic starts you on the road to answer that question.

For a computer to perform the operations in the information processing cycle, it must be given a detailed set of instructions that tell it exactly what do. These instructions are called computer programs, program instructions, or software.

Before the information processing cycle for a specific job begins, the computer program corresponding to that job is loaded; the computer can begin to process data by executing the program's first instruction. The computer executes one program instruction after another until the job is complete.

Objective:

You should be able to describe the different categories of computer software, explain the basic functions of an operating system and be able to name the most common operating systems available for microcomputers.

Pre requisite

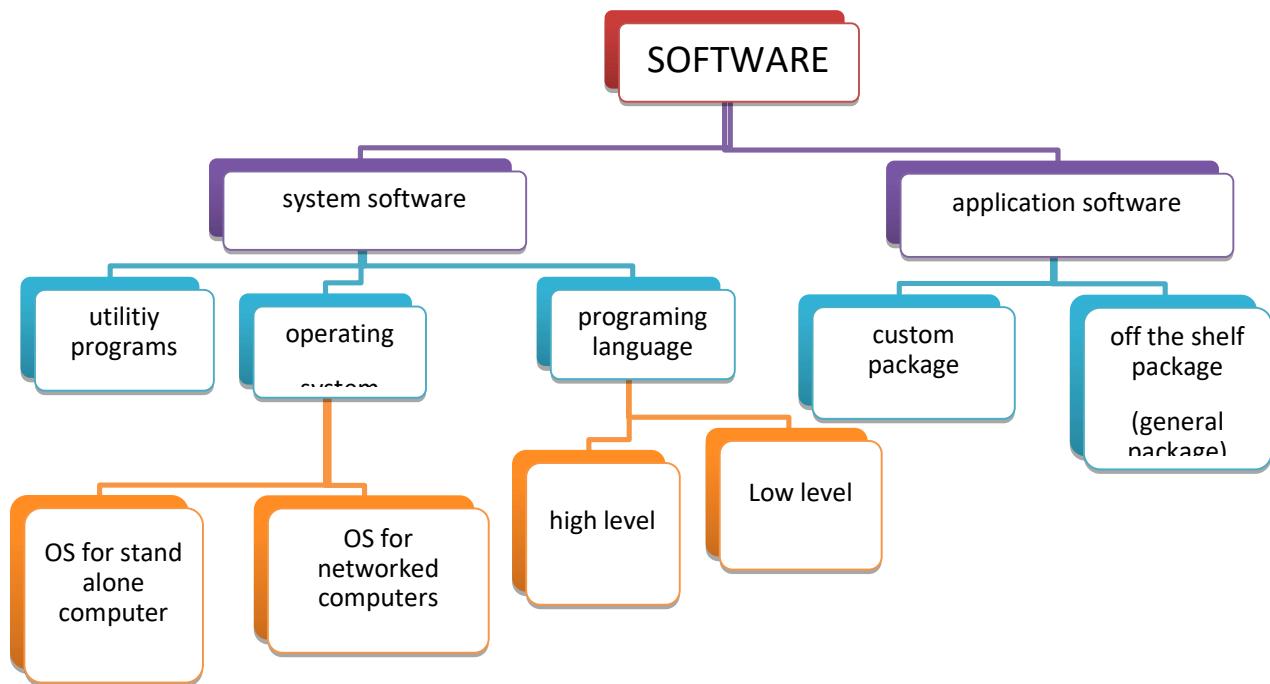
You should have knowledge concerning the physical components of the computer.

Definition:

- ✍ Computer software is a set of programs³ that tell the hardware of the computer what to do.
- ✍ Set of instructions or programming codes that is written to instruct a computer to do certain tasks or functions.
- ✍ Programs that direct the activities of a computer system.

The computer software however, may mean all the intangible components of the computer. It is used to describe the complete range of computer programs that convert a general purpose computer system into one capable of reforming a multitude of specific functions.

Computer software classifications flow



Types of computer software.

These are basically two broad classified categories/ types of computer software

³A program is a machine readable instruction.

- System software.
- Application software.

System software

Consists of programs that control the operations of the computer and its devices.

System software is a collection of programs designed to operate, control and extend the processing capabilities of the computer itself.

System software has direct control and access to your computer hardware and memory locations. They perform input/output operations on various memory locations, and control the hardware to make the application software do a task.

System software is usually supplied by the manufacturer of the computers and part of these programs reside inside the ROM

and these are known as **firmware** for example BIOS which is a firmware for start-up instructions.

System software also serves as an interface between the user, the application software and the hardware.

Note: *The user interface controls how users enter data and instructions into the computer, and how information is displayed on the screen.*

There are basically **two** types of user interfaces:

1. Command line interface (CLI).

Here a user types keywords or presses special keys on the keyboard to enter data & instructions. The set of commands a user uses to interact with the computer are called command languages e.g.

-  ASSOC - Displays or modifies file extension associations.
-  ATTRIB - Displays or changes file attributes.
-  BREAK - Sets or clears extended CTRL+C checking.

 BCDEDIT	-	Sets properties in boot database to control boot loading.
 CACLS	-	Displays or modifies access control lists (ACLs) of files.
 CALL	-	Calls one batch program from another.
 CD	-	Displays the name of or changes the current directory.
 CHCP	-	Displays or sets the active code page number.
 CHDIR	-	Displays the name of or changes the current directory.
 CHKDSK	-	Checks a disk and displays a status report.
 CHKNTFS	-	Displays or modifies the checking of disk at boot time.
 CLS	-	Clears the screen.
 CMD	-	Starts a new instance of the Windows command Interpreter.
 COLOR	-	Sets the default console foreground and background Colors.
 COMP	-	Compares the contents of two files or sets of files.
 COMPACT	-	Displays or alters the compression of files on NTFS partitions.
 CONVERT	-	Converts FAT volumes to NTFS. You cannot convert thecurrent drive.
 COPY	-	Copies one or more files to another location.
 DATE	-	Displays or sets the date.
 DEL	-	Deletes one or more files.
 DIR	-	Displays a list of files and subdirectories in a directory.
 DISKCOMP	-	Compares the contents of two floppy disks.
 DISKCOPY	-	Copies the contents of one floppy disk to another.
 DISKPART	-	Displays or configures Disk Partition properties.
 DOSKEY	-	Edits command lines, recalls Windows commands, andcreates macros.
 DRIVERQUERY	-	Displays current device driver status and properties.
 ECHO	-	Displays messages, or turns command echoing on or off.
 ENDLOCAL	-	Ends localization of environment changes in a batch file.
 ERASE	-	Deletes one or more files.

-  EXIT - Quits the CMD.EXE program (command interpreter).
-  FC - Compares two files or sets of files, and displays the differences between them.
-  FIND - Searches for a text string in a file or files.
-  FINDSTR - Searches for strings in files.
-  FOR - Runs a specified command for each file in a set of files.
-  FORMAT - Formats a disk for use with Windows.
-  FSUTIL - Displays or configures the file system properties.
-  FTYPE - Displays or modifies file types used in file extension associations.
-  GOTO - Directs the Windows command interpreter to a labeled line in a batch program.
-  GPRESULT - Displays Group Policy information for machine or user.
-  GRAFTABL - Enables Windows to display an extended character set in graphics mode.
-  HELP - Provides Help information for Windows commands.
-  ICACLS - Display, modify, backup, or restore ACLs for files and directories.
-  IF - Performs conditional processing in batch programs.
-  LABEL - Creates, changes, or deletes the volume label of a disk.
-  MD - Creates a directory.
-  MKDIR - Creates a directory.
-  MKLINK - Creates Symbolic Links and Hard Links
-  MODE - Configures a system device.
-  MORE - Displays output one screen at a time.
-  MOVE - Moves one or more files from one directory to another directory.
-  OPENFILES - Displays files opened by remote users for a file share.
-  PATH - Displays or sets a search path for executable files.
-  PAUSE - Suspends processing of a batch file and displays a message.

	POPD	-	Restores the previous value of the current directory saved.
	PRINT	-	Prints a text file.
	PROMPT	-	Changes the Windows command prompt.
	PUSHD	-	Saves the current directory then changes it.
	RD	-	Removes a directory.
	RECOVER	-	Recovers readable information from a bad or defective disk.
	REM	-	Records comments (remarks) in batch files or CONFIG.SYS.
	REN	-	Renames a file or files.
	RENAME	-	Renames a file or files.
	REPLACE	-	Replaces files.
	RMDIR	-	Removes a directory.
	ROBOCOPY	-	Advanced utility to copy files and directory trees
	SET	-	Displays, sets, or removes Windows environment variables.
	SETLOCAL	-	Begins localization of environment changes in a batch file.
	SC	-	Displays or configures services (background processes).
	SCHTASKS	-	Schedules commands and programs to run on a computer.
	SHIFT	-	Shifts the position of replaceable parameters in batch files.
	SHUTDOWN	-	Allows proper local or remote shutdown of machine.
	SORT	-	Sorts input.
	START	-	Starts a separate window to run a specified program or command.
	SUBST	-	Associates a path with a drive letter.
	SYSTEMINFO	-	Displays machine specific properties and configuration.
	TASKLIST	-	Displays all currently running tasks including services.
	TASKKILL	-	Kill or stop a running process or application.
	TIME	-	Displays or sets the system time.
	TITLE	-	Sets the window title for a CMD.EXE session.
	TREE	-	Graphically displays the directory structure of a drive or path.

- ✍ TYPE - Displays the contents of a text file.
- ✍ VER - Displays the Windows version.
- ✍ VERIFY - Tells Windows whether to verify that your files are written correctly to a disk.
- ✍ VOL - Displays a disk volume label and serial number.
- ✍ XCOPY - Copies files and directory trees.
- ✍ WMIC - Displays WMI information inside interactive command shell.
- ✍ MEM - display available memory etc.



```

.wmdb=WMP.WMDBFile
.wmf=wmffile
.wms=WMP11.AssocFile.WMS
.wmv=WMP11.AssocFile.WMU
.wmx=WMP11.AssocFile.ASX
.wmz=WMP11.AssocFile.WMZ
.wpl=WMP11.AssocFile.WPL
.usc=script letfile
.wsf=WSFFile
.wsf=WSHFile
.wtx=txtfile
.wux=WMP11.AssocFile.WUX
.xaml=Windows.XamlDocument
.xbap=Windows.Xbap
.xht=xhtmlfile
.xhtml=xhtmlfile
.xml=xmlfile
.xps=Windows.XPSReader
.xsl=ms=MSppLicenseFile
.xsl=xslfile
.zip=CompressedFolder
.ZFSendToTarget=CLSID\{888DC460-FC0A-11CF-8F0F-00C04FD7D062>

```

Advantages of CLI

- ✍ Takes up little memory and normally does not require a very fast processor.
- ✍ Operation is fast because commands can be entered directly through the keyboard.
- ✍ Many commands can be grouped together as a batch file so that repetitive tasks can be automated.

Disadvantages.

- ☞ Command language has to be learnt and memorized.

2. Graphical user interface (GUI).

It allows a user to use menus and visual images such as icons buttons and other graphical objects to issue commands.

Note: *Icons are small pictures that represent/stand for something like a file, volume, trash or program.*

Advantages of GUI

- ★ User friendly because it is easy to work and learn with
- ★ There is no need to type and memorize any command language
- ★ Interface is similar for any application

Disadvantages of GUI

- ↖ Normally requires more memory as well as a faster processor (CPU)
- ↖ It also occupies more disk space to hold all the files for different functions
- ↖ It is difficult to automate functions for expert users.

Types of system software

There are basically three main types of system software (categories/branches of system software)

- Operating system (OS)
- Utility programs (software)
- Programming language

UNEБ 2017 Qn 8(a) What is system software?(01 mark)

(b) Outline any four functions of an operating system (04 marks)

OPERATING SYSTEM (OS)

Definition:

- ✍ An operating system is a set of programs containing instructions that coordinates all the activities among the computer hardware devices.
- ✍ An operating system is specialized software that controls and monitors the execution of all other programs that reside in the computer including application programs and other system software.
- ✍ OS may be defined as simply a program that acts as an interface between the software and computer hardware.
- ✍ Operating system may also be defined as programs that manage/control the computer resources.

It is the only program that is loaded first during booting of a computer and it resides in the memory at all times. The operating system also relies on device drivers to communicate with each device (peripherals) in and on the computer. Each device on a computer for example mouse has its own specialized set of commands and thus requires its own specific driver. The Operating System loads each device's driver when the computer boots up and it also contains instructions to run application software.

Note:

A device driver is a small program that tells the operating system how to communicate with a device.

Or

A computer program that operates and controls a particular type of device that is attached to a computer.

Classifications of operating system

Operating system is classified into very many ways for example:-

- a) **Single program Operating System.** Allows only one program to run at a time.

- b) **Multitasking⁴Operating System.** Allows many programs to run at same time.
- c) **Time sharing Operating System.** Several users can be using the same computer on the network or even the same program on the computer sharing the processor time.
- d) **Multiprocessing Operating System.** Support two or more CPUs running programs at the same time.

Functions of operating system

The following are some of the important functions of an operating system.

- ✍ Memory management.
- ✍ Spooling print jobs.
- ✍ Configuring devices.
- ✍ Monitoring system performance.
- ✍ Administering security.
- ✍ Managing storage media and files.
- ✍ Processor management.
- ✍ Error detecting.
- ✍ Coordination between the software & users (user interface).
- ✍ Device management

a) Memory management.

Memory management refers to management of primary memory (main memory).

The purpose of memory management is to optimize the use of RAM (main memory). The Operating System has to allocate or assign items to areas of memory called buffers while they are being processed to monitor carefully the contents of these items in the memory and to clean these items from memory when they are no longer required by the CPU. Some operating systems use virtual memory to optimize RAM.

⁴ It is an activity in which several tasks ("multiple tasks") can be performed concurrently.

Note: *Buffer is a memory/storage area in which data/information is placed while waiting to be transferred to or from an input or output devices.*

The Operating system performs the following activities for memory management:

- ✍ Keeps tracks of primary memory ,that is, it is the operating system to find out what part of primary memory is in use, by whom and what part are not in use.
- ✍ In multi programming, Operating system decides which process will get memory when and how much.
- ✍ The operating system allocates memory for incoming process whenever it requests.
- ✍ De-allocates memory when the process no longer needs it or has been terminated.

b) Spooling print jobs.

Multiple print jobs are queued or lined up, in the buffer.

The program that manages and intercepts print jobs and places them in the queue is called the printer spooler.

c) Configuring devices.

Most Operating System today supports plug and play (PnP) and can configure devices automatically unlike in the past where installing new devices required setting switches and other elements on the motherboard and occasionally, a user needed to know the interrupt request (IRQ) the device should use for communication.

IRQ (interrupt request) is a communication line between a device and the CPU (there are 16 IRQs numbered from 0-15).

d) Monitoring system performance.

A performance monitor is a program that accesses and reports information about various system resources and devices. The information in such reports can help a user identify problems with the resources.

e) Administering security.

Most multiuser Operating System requires each user to log on by either use of passwords or user name or both.

Both successful and unsuccessful log on attempts are often recorded in a file so a system administrator can review who is using or attempting to use the computer.

Note:

Log on: is the process of entering a user name and a password into a computer.

Password: is a combination of characters associated with a user name that allows a user to access a computer or network

f) Managing storage media and files.

Most operating systems include a file manager program that performs functions related to storage and file management.

File manager is a program that performs functions related to storage and file management.

Functions performed by a file manager include;

- ★ Formatting and copying disks.
- ★ Displaying a list of files on a storage media.
- ★ Checking the amount of used or free space on a storage medium.
- ★ Copying, renaming, deleting, moving and sorting files.

g) Processor management.

In multiprogramming, operating system decides which process gets the processor when and for how much time. This function is called process scheduling (in other words the operating system allocates the process to a processor and vice versa).

h) Device management.

Operating system manages device communication via their respective drivers.

The OS does the following for device management:-

- ✍ Keeps track of all devices
- ✍ Allocates & De-allocates the devices in the efficient way.

i) **Error detecting.**

In summary Operating System offers the following basic functions:

- Booting computer
- Manages the various peripherals for example mouse, printers, scanners etc.
- Provides user interface.
- Handles system resources such as computer memory, CPU etc.
- Provides file management.
- Job scheduling i.e. it determines what task will use what resource and at what time.
- Interrupts handling.
- An interrupt is a break from the sequential processing of a task/program by transferring control to a new process that requests to be executed.
- Resource control and allocation.
- Sharing of files.
- Organize/sort files.
- Allows a user to save files to a backup store.

Examples of Operating System:

✍ **DOS (disk operating system)**

This refers to several single user operating systems that were developed in the early 1980's for computers. The two more widely used versions of DOS were PC DOS and Ms DOS both developed by Microsoft. Earlier versions of DOS used purely command line interface. DOS is not widely used today because it does not offer a Graphical User Interface (GUI).

✍ **Windows 3.x**

Refers to three versions of Microsoft windows, windows 3.0, 3.1 and 3.11. These windows 3.x versions were not actually OS but operating environments.

An operating environment is a GUI that works in a combination with an OS e.g. DOS.

Windows 10

This is a time multitasking OS that is almost replacing windows 8.1

Advantages of Windows 10.

- An improved GUI.
- Most programs run faster under the OS.
- Take an advantage of 32 bit processors.

A multitasking OS allows a single user to work on two or more applications that reside in memory at the same time.

Windows NT

This is an OS designed for client server networks. The clients connect to the server using a version called windows NT OS

Windows 98

This is an upgrade to the Windows 95 OS

Advantages of windows 98.

- It has an active desktop interface
- It is more integrated with the internet
- It provides a faster system start up and shut down
- There is better file management
- It supports new multimedia technologies such as DVD and web TV
- Supports USB
- It can run (16-32) bit software

An active desktop interface option allows a user to set up windows so that icons on the desktop and file names in windows explorer work like web links.

Windows 200 professional

This is an upgrade version of windows NT. Windows 2000 replaced windows 95. It has all the advantage of Windows 95 and was much more faster

Windows 2000 professional is a standalone version for business desktop or laptop computers as well as computer connected to the networks.

Versions of windows 2000 are windows 2000 server family and the windows 2000 professional.

Windows ME (millennium editor)

This is an updated version of windows 98 for the consumer that uses a computer to surf the internet or for entertainment. It was mainly designed for home users.

Windows XP home edition

It is an upgrade to windows ME.

It has the following added features;

- ✓ Internet explorer 6.
- ✓ Acquire, organize and share digital pictures.
- ✓ Download, store, and play back high quality music through windows media player.
- ✓ Create, edit and share videos with windows movie maker.
- ✓ Connect easily and share multiple home computers.
- ✓ Windows messengers (video conferencing).

Windows XP professional

It is an upgrade to windows 2000 professional added features include;

- ☞ All capabilities of windows XP home edition.

- ☛ Create data security through encryption of files and folders.
- ☛ Remotely access a computer, its data and its files from any computer.
- ☛ Simpler administration of groups of user of computers.
- ☛ Supports for secured wireless network access.

Mac OS

It is the first commercially successfully GUI, released with apple's Macintosh computers in 1984. It set the standard for GUI for non-Macintosh systems. It has the capability of opening, editing and saving files created using the windows & DOS platforms.

OS/2

It is an IBM's multitasking GUI OS designed to work with 32 bit microprocessors.

It also runs programs written for DOS and most windows 3.x.

Netware

Novell's Netware is a widely used OS designed for client server networks

UNIX.

It is a multiuser, multitasking OS developed in the early 1970 by scientists at bell laboratories.

A weakness of UNIX is that it has a command line interface (CLI) and many of its commands are difficult to remember and use.

Linux

It is a popular free UNIX like multitasking OS. It is an open source software which means its code is made available to the public. Some versions of Linux use Command Line Interface while some use Graphical User Interface (GUI). GUIs available for Linux are GNOME and KDE.

Solaris

It is a version of UNIX developed by sun Microsystems.

It is a network OS designed specifically for e-commerce applications.

Windows CE

Is a scaled down OS designed for use as wireless communication devices and hand held computers.

Palm OS

Is an OS for PDAs that can manage schedules and contacts and easily synchronize this information with a desktop computer.

Pocket pc 2002

Is a scaled down OS developed by Microsoft that works on a specific type of hand held computers called pocket PC.

Types of operating system

The Operating Systems were there from the very first computer generations. It keeps evolving over a period of time. Following are few types of OS which are commonly used:

Batch operating system

Each user prepares his/her job on an offline device like punch card and submit it to the computer operator, for faster processing, jobs with similar needs are batched together to run as a group. The operator sorts programs into batches with similar requirements.

Users of batch OS do not interact with the computer directly

Time sharing OS

Time sharing is a technique which allows many people, located at various terminals to use a particular computer system at the same time.

Sharing processor's time among multiple users is termed as time sharing.

Multiprocessing OS

It supports and utilizes two or more CPUs running programs at the same time.

Distributed OS

An OS that manages a group of independent computers and make them appear to be single computer.

Or

Distributed system uses multiple central processors to serve multiple real time application and multiple users.

Data processing jobs are distributed among the processors accordingly to which one can perform each job efficiently.

These processors communicate with one another through various communication lines.

Single user OS

 Allows only one user to run one program at a time eg command line interface (DOS).

Multi user operating system

Enables two or more users to run a program or compute simultaneously eg Linux, Unix, windows OS

Network OS

This runs on a server and provides a server the capability to manage data, users, groups, security, applications, and other networking functions.

The primary purpose of the network OS is to allow shared files and printer access among multiple computers in a network e.g. LAN, private network etc. e.g. MS windows server 2003, 2008, 2000, BSD, Useful (for Linux), Mac OS x, novel network etc.

Multitasking

Capable of allowing multiple software processors to run at the same time (program to run at the same time)

Real time OS

Real time system is defined as data processing systems in which the time interval required to process and respond to inputs is so small that it controls the environment

Embedded system

This is designed for being used in the embed systems.

Multithreading. Allows different parts of a software program to run at the same time

Factors to consider when buying an OS.

- ❖ The hardware specifications of a computer e.g. memory size, processor speed.
- ❖ The type of computer in terms of size and make (compatibility).
- ❖ Application software intended for the computer.
- ❖ User friendliness of the operating system.
- ❖ Documentation available.
- ❖ Reliability and security provided by OS.
- ❖ Number of processors and hardware it can support.
- ❖ The number of users it can support.
- ❖ Cost of the operating system.

Tasks performed by Operating System

- ✿ Manage and allocate computer resources.
- ✿ Control input and output devices.
- ✿ Manages computer memory usage.
- ✿ Schedules computer operations.
- ✿ Provides a working environment for all computer resources.

Utility programs/ services

Definition

- *Utility program is a type of system software that performs a specific task, usually related to managing a computer, its devices, or its programs.*

- These are system programs used to enhance the performance of the operating system.
- These are programs designed for general support of the computer processes. The support includes sort/ merge operation, formatting, removal of virus etc.

Types of utility programs (examples)

- **File viewer.** It is a utility that displays and copies the contents of a file

Note: an Operating System's file manager includes a file viewer.

- **File compression utility.** It reduces/ compresses the file size. The compressed file takes up less storage space on a storage medium which frees up room on the disk and improves computer performance. Compressed files are called zipped files because they usually have zip extension

Examples of compression utility include:-

- Pk zip.
- Win zip.

- **Diagnostic utility.** It compiles technical information about a computer's hardware and certain system software programs and then prepares a report outlining any identified problems. Windows XP contain Dr. Watson as a diagnostic utility.
- **Sort - merge utility.** Sorting is the term given to arranging data records in a predefined sequence or order **while** Merging is the combining of two or more ordered files into one file.
- **Disk scanner.** It is a utility that detects and connects both physical and logical problems on a hard disk, flash disk etc. and searches for unwanted files and removes them. Physical problem is one with the media e.g. scratch on the surface of the disk. Logical problem is one with the data e.g. corrupted file allocated table (FAT)

Examples of disk scanner utilities for windows include;

- scan disk
- Disk clean up

Functions of utility programs

- Listing files on a disk
- Back up data/ files
- Deletes files
- Repairs damaged file e.g. antivirus like Norton
- Detects and removes errors & viruses
- Data recovery by use of disk repairing software like scan disk, Norton disk doctor (NDD)
- Copy files
- Compress files
- Sorts data
- Disk fragmentation.
- Data communication.

Programming languages

Definition:

- A set of commands used to write computer software.
- It is a set of instructions employed to direct the operation of a computer.
- A special notation in which instructions for controlling a computer are written.

All computer programs use these languages to develop new software and controlling computes.

Programming language are designed to be easy for people to write and read but must be capable of being mechanically translated into machine code (binary) that the computer can execute (in this case the CPU).

Characteristics of programming language.

- ★ Every programming language has instructions for input and output.
- ★ Have instructions for calculations.

★ Have instructions for transferring of control instructions for data movement, storage and retrieval.

★ Have instructions for data movement.

Note:

Machine language consists of binary numbers that represent instructions, memory locations, and data so that they may be processed.

Classification of programming language.

Programming language languages are classified into two:-

- **Low level language.**

Low level programming language refers to the native language of the computer.

It is presented to the computer as binary coded machine instructions that are specific to CPU model. In short, low level programming language is a language that a computer understands.

- **High level language.**

High level programming language refers to an artificial language used to write instructions that can be translated into machine language and then executed by a computer.

A programming statement may be translated into one or several machine instructions by the computer.

High level language consists of statements that are closer to human language or mathematical notation than machine/assembly languages.

High level language is a machine independent and is user friendly and oriented rather than machine based and has a wide vocabulary of valid words, symbols and statements.

Language processors.

These are mainly used with high level programming language to work backwards to the processor. Their main work is to translate high level programming languages to the codes/into low level language codes that CPU can understand e.g.

1. Compilers.

These translate a program written in high level programming language into machine language/assembly code program or low level language. It translates an entire program all at once.

2. Interpreters.

These translate the source program line by line while program is running. This is done each time the program is executed. As a result a program running under an interpreter runs slowly as compared to a compiled program.

Or

An interpreter translates a high level language to a low level language (machine language) and executes it before proceeding to the next instructions (it translates in smaller bits).

3. Linkers.

These programs combine compiled programs and determine where the program will be located in memory. When linkers have transformed an object code, an executable file is generated. This results in files with the extension .exe.

Examples of high level programming language.

There are over 1000 high level programming language (simply programming languages) but the most popular ones are:-

- i). FORTRAN (Formula Translator/Formula translation). It was developed in 1956 to provide an easier way of writing scientific and engineering applications because of its simplicity, conciseness, standardization, efficiency and numerical data.
- ii). COBOL (Common Business Oriented Language). Came into use in late 1960 and has a wide spread application in business, commercial data and it is noted for its ability to handle the input and output of large volumes of alphanumeric data.
- iii). BASIC (Beginner's All-purpose Symbolic Instruction Code). Was developed in 1964 by John Komen and Thomas Kurtz to teach students how to use computers. It is common language on micro-computers.
- iv). Pascal. It was developed in early 1970s and it is a tool for teaching programming by Swiss computer professor Nicklaus W and nicknamed it Pascal in remembrance of the inventor of the mechanical calculator.
- v). C, C++, C#. These are object oriented version of C.
- vi). Dbase.
- vii). FORTH developed in 1960 used in process control and game application.
- viii). ADA. Named in honor of Lady Augustus Lovelace who worked with Charles Babbage at Cambridge University in English.
- ix). Java. It is a programming language developed by sun and repositioned for web use.
- x). Java script. It is a scripting language used in the web. It is embed into many HTML pages.
- xi). HTML (Hypertext markup language). It is used to create web pages.
- xii). PERL (Practical extraction and report language). It is a scripting language widely used on the web to write CGI scripts.
- xiii). PHP (Hypertext preprocessor)
- xiv). ASP. etc.

Application software

Definition:

- ✍ These are programs that perform specific tasks for users for example writing, calculating, painting, playing etc. and run under system software.
- ✍ Programs that handle the needs of the end users
- ✍ Programs that are designed to satisfy a particular need of a particular environment.

Application software may consist of a single program like notepad for writing and editing simple text or a collection of programs (software packages) like spreadsheet package.

Types of application software (classifications)

Application software basically falls into two main categories or types which include;

1. Custom/tailor made software (Special purpose packages)

Are written to meet specific needs of an organization that cannot be usually satisfied by other sources of software e.g. best grade, school write, accounting package etc. The buyer specifies the content of the software program e.g. report generating, payroll calculations, monitoring discipline in school etc.

2. off the shelf software (General purpose packages)

These are software which may be used for a wide variety of purpose e.g. word processors, spreadsheets, database, presentation software etc.

They are usually ready-made software on the market and it is the seller who determines the content of the software e.g. MS word, MS PowerPoint etc.

Some of common tasks done by the general purpose applications include

- Planning
- Writing
- Record keeping
- Calculating
- Communicating
- Drawing

- Map making and drawing
- Painting

Application software are adapted to a wide variety of tasks, that is to say, they can be used to do more than one task. Many application software packages are also available as shareware, freeware, and public domain software, however such packages usually have fewer capabilities than packaged software.

Note: An application package that runs identically on multiple operating systems is called **Cross Platform Form** applications and they often have multiple versions each corresponding to different operating systems.

An application service provider (ASP) is a third party organization that manages and distributes software and services on the web.

Forms of software

Software are available in a variety of forms:-

- i. **Package software.** Is commercial software which is copy righted and designed to meet the needs of a wide variety of users.
- ii. **Custom software.** This is tailor made software which is developed at a user's request to perform specific functions.
- iii. **Free ware.** Is a copy righted software provided at no cost to users.
- iv. **Shareware.** Is a copy righted software that is distributed free for a trial period and payment is required for using the software beyond that trial period.
- v. **Public domain software.** Is free software donated for public use and has no copy right restrictions.

Common examples of application software

- ✍ **Word processor (word processing software).** Used to create, edit, format, save, print documents that contain text and graphics e.g. Corel word perfect, Microsoft word, word star, lotus word pro, word pad etc.
- ✍ **Text editors.** Used for writing and editing simple text e.g. note pad, iMacs.
- ✍ **Spreadsheet software.** Used to organize data in row, column and perform calculations on the data e.g. MS excel, lotus 1-2-3, Corel Quattro pro, Visual Calc, SPSS, super calc, VP-planner...
- ✍ **Database software (DBMS).** Allows users to create access and manage database e.g. MS access, MS visual fox pro, Borland Dbase, Dbase IV, lotus approach...
- ✍ **Presentation software.** Used to create presentation which can communicate ideas and other information to a group of audience e.g. MS PowerPoint, Corel presentation, lotus freelance graphics, Prezi, open office. Org impress etc.
- ✍ **Software suite.** Is a collection of individual application software packages sold as a single package e.g. MS office, lotus smart suite, Corel word perfect suite etc.
- ✍ **Integrated software.** Combines applications software/ programs such as word processing, spreadsheet and database into a single easy to use package e.g. MS workers.
- ✍ **Computer aided design (CAD) software.** Is mainly used for creating engineering, architectural and scientific drawings e.g. auto desk, auto CAD and MS visw technical.
- ✍ **Desktop publishing software.** Used to design and produce complicated documents that contain text, graphics and brilliant colors or Used in creation of newsletters, brochures etc. e.g. MS Publisher, adobe page maker, adobe in design, quark xpress, Broder band print shop pro.
- ✍ **Accounting software.** Is used by companies to record/ report the financial transactions e.g. Intuit quick books, peach trees complete accounting.
- ✍ **Paint and image editing software.** Is used to create and modify graphical and photo images e.g. Ms photo draw, paint shop pro, adobe photo shop, Corel draw etc.

- ✍ **Project management software.**
- ✍ **Personal information managers.**
- ✍ **Video and audio editing software.** It is used to modify a segment of video or video clips e.g. adobe premiere, pinnacle studio, u lead videos studio, u lead media studio, windows movie maker etc.
- ✍ **Multimedia authority software.** Combines text, graphics, animations, audio and video into an application e.g.
 - ★ macro media author ware
 - ★ Macro media director
 - ★ Macro media flash
- ✍ **Webpage authority software.** Is specially designed to create Webpages that contain text and multimedia elements e.g.
 - ❖ MS front page
 - ❖ Macro media dream weaver
 - ❖ Adobe go live
 - ❖ Adobe page mill
- ✍ Publisher **Personal finance software.** Is often a simplified accounting program that helps a user to pay bills, balance the check book, track person income and expenses, track investments and evaluate financial plans e.g. MS money, Inuit quicker.
- ✍ **Education software.** E.g. encyclopedias, dictionaries, health and medical guides contain valuable and through information for reference purposes e.g. MS Encarta, Mosby's medical encyclopedias & Webster, dictionary & thesaurus.
- ✍ **Entertainment software.** Include interactive games, videos plus other programs designed to support a hobby or provide amusement and enjoyment. (Both education & entertaining programs).

 **Communication software.** Consists of programs that help to establish a connection to another computer or network and manage the transmission of data, instructions and information between computers and other devices e.g.

- Email software
- Web browser
- Chat room software
- Instant messenger
- Group ware
- Video conferencing

Music/sound software e.g. iTunes, VLC players, windows media players, etc.

Characteristics of application packages

- They are targeted to a wide range of users with popular and common objectives.
- It is user friendly/ easy to use i.e. many of them have GUI in windows environment which makes it easy to learn and use.
- It is designed for power & flexibility. It ensures that most of the capabilities of the package is addressed irrespective of the hardware.
- The software should be machine independent. Packages are designed to work on range computer systems & data can be transferred from one computer to another cheaply.

Computer viruses

Computer Viruses are destructive programs designed to affect, or infect a computer negatively by altering the way it normally works without the knowledge or permission of the owner.

Types of destructive viruses

Massive destruction:

Attacks the formats of diskettes whereby any program or damage will be unrecoverable.

Partial destruction:

modifies a specific portion of disk affecting any files stored in that location.

Selective destruction:

Erases and modifies specific files or file groups.

Random havoc:

Randomly changing data or data in memory during normal program execution, or changing key stroke values, or data from other input/output devices.

Network saturation:

It systematically uses up memory or space to impede performance or cause the system to crash.

BOMBS

The two most prevalent types of bombs are time bombs and logic bombs. A time bomb hides on the victim's disk and waits until a specific date before running. A logic bomb may be activated by a date, a change to a file, or a particular action taken by a user or a program. Bombs are treated as viruses because they can cause damage or disruption to a system.

UNEБ 2016 Qn 9 Indicate TRUE or FALSE against each statement on the table below (05 marks)

	STATEMENT	TRUE/FALSE
a	Public domain software is copyrighted	False
b	Off the shelf software is developed and sold for profit	True
c	Source codes of open source software programs are only available to be paid up subscribers	False
d	Shareware programs are widely available from a variety of download sites on the internet	true
e	Freeware programs are frequently developed by only amateur programmers	true

How viruses spread from one system to another

The most likely virus entry points are;

- ✓ E-mail,
- ✓ Internet
- ✓ Network connections,
- ✓ Floppy disk,
- ✓ Modems or other serial or parallel port connections.

In today's increasingly interconnected workplace (Internet, intranet, shared drives, removable drives, and email), virus outbreaks now can spread faster and wider than ever before.

Sources of computer viruses

Contact with contaminated systems; any diskettes used on a contaminated system could become contaminated. If the diskettes are used on another system, then the virus will spread.

Pirated software- the use of pirated software introduces the risk that the software may be contaminated by virus code.

Fake games- many people like playing games on computers and for the same reason games programs spread virus very fast.

Freeware and shareware- Both freeware and shareware programs are commonly available from bulletin Board systems (BBS)

Places where viruses are applied

A macro virus: uses the macro language of an application (e.g. word processor or spreadsheet) to hide the virus code.

A logic bomb: is a virus that activates when it detects a certain condition.

A time bomb: is a kind of logic bomb that activates on a particular date.

A worm: copies itself repeatedly in memory or a disk drive until no memory or disk space remains, which makes a certain condition or action is triggered.

A polymorphic virus: modifies its program code each time it attaches itself to another program or file, so that even an anti virus utility has difficulty in detecting it.

Symptoms of a computer virus

- Unfamiliar graphics or quizzical message appearing on screen.
- Programs taking longer than usual to load
- Disk access seeming excessive for simple tasks.
- Less memory available than unusual
- Access lights turning on for non referred devices
- Computer hard drive space is reduced.
- Application programs will not load.
- The number of hard drive bad sectors steadily increases.
- A message appears that hard drive cannot be detected or recognized.
- Strange sounds come from the computer.
- Failure for the Computer to boot up.
- Some viruses take control of the keyboard and occasionally substitute a neighboring key for the one actually pressed. Another virus "swallows" key presses so that nothing appears on the screen.
- Also interesting are system time effects. Clocks going backwards are especially frightening for workers who cannot wait to go home. More seriously though, this type of virus can cause chaos for programs which depend on the system time or date.
- Some viruses can cost the user dearly by dialing out on his modem. We do not know of one which dials premium telephone numbers but no doubt we shall see one soon. One particularly malicious virus dials 911 (the emergency number in the USA) and takes up the valuable time of the emergency services.

Ways in which viruses are activated on a computer

- Opening an infected file.
- Running an infected program.
- Starting up the computer with an infected floppy disk.
- Transferring data from an infected computer to uninfected computer.
- Downloading an infected file from the internet.

Precaution taken to prevent viruses

-  Write-protect the recovery disk.
-  Make sure the e-mail received is from a trusted source.
-  Try and use an anti-virus utility.
-  Do not start the computer with the floppy diskette in a floppy drive.
-  Back up important files regularly.
-  Scan all floppy disk and files for possible virus infection before opening it.

Antivirus utility

Is a program that prevents, detects, and removes viruses from a computer's memory or storage devices. One of the popular antivirus is Norton Antivirus.

Antivirus utilities normally look for various signatures to identify a virus. Examples of antivirus utilities include the following:

- ★ MacAfee antivirus.
- ★ Dr. Solomon
- ★ Norton
- ★ Node32
- ★ Penicillin antivirus.
- ★ Avira antivirus

Benefits/advantages of antivirus software

- ❖ It prevents a virus from damaging your PC or network.
- ❖ Protects your PC or network from viruses and other forms of malware.
- ❖ Prevents downtime, i.e. valuable working time could be wasted if you cannot access your PC due to a virus infection.
- ❖ Protects valuable information on your PC.
- ❖ Prevents other people outside your organization being able to access your information whether it is business or personal data. A **firewall** is a device or set of devices designed to permit or deny network transmissions based upon a set of rules and is frequently used to protect networks from unauthorized access while permitting legitimate communications to pass.
- ❖ Potentially prevents emails being sent by your system thereby damaging you and your organization's reputation. Some viruses access your email folders and send an email to all of your contacts with the virus attached.
- ❖ Prevents the time consuming and unnecessary task of having to clean or remove the virus after the damage has been done.
- ❖ Reduces the potential financial implications – getting the technical support required to achieve removal of the virus and to restore your lost information.
- ❖ Legal implications – in some instances it is required to demonstrate that your organization has taken reasonable measures to protect the information you hold about your customers and the email you exchange with them.

Disadvantages of antivirus software

- Some antivirus packages can slow down the speed of your PC or network.
- Antivirus software can require a great deal of hard disk and memory.
- Antivirus checks must be run regularly. Again, ideally you should run your antivirus software daily as internet access and email can potentially cause problems.

- Not all antivirus software is capable of being effective at dealing with viruses, spyware and adware so you may need to run two or more packages. However, be sure that you are not running two systems that conflict and prevent each other working properly.
- Antivirus software needs to be updated regularly. It is very important that the antivirus software is updated, preferably on a daily basis, because new viruses and malware are developed and the antivirus vendors will develop counter measures to deal with them. This can be achieved by automatically connecting to your supplier's website via the internet and downloading the necessary files. You can normally set this up to happen automatically.

Impact of viruses on computer systems

Virus can be reprogrammed to do many kinds of harm including the following;

1. Copy themselves to other programs or areas of a disk.
2. Replicate as rapidly and frequently as possible, filling up the infected system's disk and memory rendering the systems useless.
3. Display information on the screen.
4. Modify, corrupt or destroy selected files.
5. Erase the contents of entire disks.
6. Lie dormant for a specified time or until a given condition is met, and then become active.
7. Open a back door to the infected system that allows someone else to access and even control of the system through a network or internet connection.
8. Some viruses can crash the system by causing some programs (typically Windows) to behave oddly.

UNEB 2016 Qn.7 (a) Distinguish between system and application software (02 marks)

System software are set of programs that manage and control the operations of a computer and other types of software that run on it.

While

Application software are designed to help a user perform a specific task.

(b) Give three types of language translators used in programming. (03 marks)

- ✓ Compilers
- ✓ Assemblers
- ✓ Interpreters

Chapter questions

1(a) Explain what is meant by the term computer software? (02 marks)

(b) Mention two ways through which computer software can be acquired (02 marks)

(c) Explain, why is it important to consider user needs when purchasing computer software (01 mark)

2 Give five items that should come along with authentic software (05 marks)

3(a) Distinguish between open source and proprietary software (02 marks)

(b) Mention any three hardware details that should be considered before installing software (03 marks)

4(a) outline the three categories of system software (03 marks)

(b) State two advantages of a utility software (02 marks)

5(a) what is meant by the term operating system (02 marks)

(b) State four functions of an operating system (03 marks)

6(a) what are system software programs (02 marks)

(b) Explain the three classifications of system software (03 marks)

7 (a) Explain these terminologies as used in operating systems (03 marks)

- (i) patch
- (ii) interrupt
- (iii) troubleshoot

(b) Name any two operating systems apart from windows and Linux(02 marks)

8(a) what are programming languages (01 mark)

(b) Mention any four programming languages which you know (04 makrs)

9 State the function of the following utility programs (05 marks)

- (i) Disk defragmenters
- (ii) Diagnostic
- (iii) File compression
- (iv) Uninstaller utility
- (v) Network utility

10 (a) Distinguish between is machine language and high level language (02 marks)

(b) State two examples of high level languages (02 marks)

(c) State one advantage of high level language (01 mark)

11 (a) State two advantages of using high level programming languages over low level programming languages. (2marks)

(b) Distinguish between a computer and an interpreter. (2marks)

(c) Give one advantage of compilers over interpreters. (1 mark)

13(a). State two ways computer software can be obtained legally. (02 marks)

(b). Give two advantages of using public domain software. (02 marks)

(c). what is the importance of an anti-virus program in your computer. (01 mark)

14 (a). Define an operating system. (02 marks)

(b). Identify three utility programs that help to manage files. (03 marks)

15 Given the following information below;

A	Symantic Antivirus	D	E-mail
B	Quick Books	E	Compiler
C	Unix	F	PASCAL

Select the information from the table above which matches with the following;

- (i) Operating system
- (ii) Utility software
- (iii) Packaged software
- (iv) Programming language
- (v) Communication software

16 Indicate **TRUE** or **FALSE** against each statement in the table below. (05 marks)

		TRUE or FALSE
(a).	Windows 7 is a graphical user interface operating system.	
(b).	Electronic spreadsheets support mathematical and statistical computations.	
(c).	Word processors have formula bars	
(d).	Disk operating system is a command driven operating system	
(e).	Back up is the combination of two or more files to produce one output file.	

17). what is a software suite. (01 mark)

(b). Give the difference between shareware and freeware programs. (01 mark)

(c). Write short notes on the following:

(i). software upgrade. (01 mark)

(ii). Software bug. (01 mark)

(iii). Beta software (01 mark)

18 (a). What are systems software programs? (01 mark)

(b). State the three sub classes of system software (03 marks)

(c). Distinguish between application software and system software. (01 mark)

19(a). Mention two causes of system failure. (02 marks)

(b). State the difference between software upgrade and software update. (01 mark)

(c). Give one way system failure can be controlled. (01 mark)

20 (a). What are systems software programs? (01 mark)

(b). State the three sub classes of system software. (03 marks)

(c). Distinguish between application software and system software. (01 mark)

21(a)State two factors to consider before buying a software application program.(02 marks)

(b). Give the difference between a computer instruction and program. (01 mark)

(c). Mention two branches of system software. (02 marks)

22 (a). Give two advantages of using a shareware program. (02 marks)

(b). Mention one use of a software driver. (02 marks)

(c). Outline two examples of an application programs. (02 marks)

INTRODUCTION

TO

SPREADSHEETS

Chapter contents

Introduction

Common terms used in excel

Working with basic functions

Chapter questions

Throughout the ages, people have always needed to calculate. Tools such as the abacus were invented by the early Chinese to help keep track of large numbers. About thirty years ago, students only had pen, paper, slide rules and mathematical tables to help them in their mathematics exams. There were no such things as calculators and certainly no personal computers. Calculators eventually became everyday tools and certainly helped to speed up calculations and improve accuracy. Even then, they weren't really good enough to solve complex problems or deal with large amounts of repetitive work. With advancement in technology, spreadsheets were developed.

Objectives

You should be able to produce mark sheets, budgets, class planners and many others

Pre requisite

It would be best understood if you have gone through computer software.

Definition

A spreadsheet is a program that manipulates numbers and strings of data in rows and columns.

OR

A spreadsheet is software used to organize data in rows and columns and perform calculations on the data.

Spreadsheets are commonly used for budgets and other finance related tasks. They also provide the user with facilities for handling databases in order to organize and provide structured information and graphs to produce diagrams such as pie charts, bar graphs, radar charts, price index charts etc.

Advantages of using spreadsheets

The ability to carry out calculations automatically. Spreadsheets are some of the best information management systems for policy analysis because they offer speed, efficiency, flexibility and functionality that meet the needs of various users like the policy managers.

Spreadsheets can handle a variety of applications such as financial planning, break-even analysis, budgeting and project cost projections.

examples of spreadsheets

Electronic spreadsheets include:

- a) ms. excel
 - b) lotus 1-2-3
 - c) frame work
 - d) visual calculation
 - e) quattro pro
 - f) ms. works
 - g) xoom office
 - h) ragtime
 - i) spread32
 - j) gs-calc
 - k) softmaker office
 - l) star office calc etc.
 - m) open office calc
 - n) zoho sheet
 - o) super calc

functions of spreadsheet software

- ✓ help in the entering mathematical data
- ✓ helps in calculating values
- ✓ helps in creating simple lists and tables of alphabetic and numerical data.
- ✓ create and manipulate simple tables.
- ✓ establishes relationships between sets of numerical data.
- ✓ help in representing data in graphical form or chart form.
- ✓ for data sorting
- ✓ enable data formatting
- ✓ they help to create, edit, save and retrieve worksheets.

uses of a spreadsheet

- used to keep accurate financial records
- it helps accountants to track daily income and expenditures and analyze the performance of businesses.
- it is used in accounting, marketing finance and business planning.

characteristics of spreadsheets

- ★ They have a grid like structure that is made of columns and rows.
- ★ They comprise of cells, cell addresses, cell references and normally the active cell.
- ★ They have the ability to select cells or range of cells.
- ★ They are capable of making calculations aided with functions or formula.
- ★ They are capable of inserting and deleting columns.
- ★ They contain a formula bar where functions are entered or inserted.
- ★ They only deal with calculations.
- ★ it has built-in mathematical formulae and functions which manipulate numbers

introduction to Microsoft excel

Ms. excel is a spreadsheet program that allows you to create a spreadsheet that can perform automatic calculations.

or

Ms. excel is a spreadsheet application that can be used to create worksheets, charts, lists and even web pages.

Common terms in excel

Row: these are referenced by row numbers i.e. 1:1 is the reference to the first row. they range from 1 to 1048576 rows.

Column: these are referenced by column name i.e. a:a is the reference for the first column.

Cell: a cell is an intersection of a row and a column. each cell has a unique cell address (e.g. a1) to define its location on the worksheet.

Worksheets: these are sheets that contain rows and columns of cells. a worksheet is a single page or sheet in an excel spreadsheet. it is the primary page primary page used in a spreadsheet program. By default, there are three worksheets per workbook. on each worksheet, data is organized vertically in columns and horizontally in rows. switching between worksheets is done by clicking on the sheet tab at the bottom of the screen.

Workbook: these are containers of a number of worksheets or it is a multipage excel document that contains multiple worksheets. the number of worksheets in a workbook is limited only to memory space available.

Cell address: excel uses the a1 reference style, which refers to columns with letters a through xfd. to give the cell address in column a and row 6, the cell address is (A6).

Cell range: this is the distance between different cell addresses. a range is a group of cells in a worksheet that have been selected or highlighted. a range is identified by the references of the

cells in the upper left and lower right corners of the range. these two references are separated by a colon (:) which tells excel to include all the cells between these start and end points. an example of a range of adjacent cells would be B5: D10.

Cell reference: this is the address of a cell or a range of cells in a worksheet. a cell reference identifies the location of a cell or group of cells in the worksheet. it consists of the column letter and the row number that intersect at the cell's location. when listing a cell reference, the column letter is always listed first. the current cell reference can always be found in the name box. in some spreadsheet programs, a cell reference is referred to as a cell address.

active cell: this is the cell you are working with at that particular moment or time. this cell is surrounded by a black border. the black border is referred to as the active cell highlight. data can only be entered into the active cell. even if more than one cell is selected, there is still only one active cell.

Data: data is information that is stored in a spreadsheet program. data is stored in the individual cells of a worksheet. Only one piece of data is stored in each cell. in addition to being stored in the spreadsheet, the data can be used in calculations, displayed in graphs, or sorted and filtered to find specific information. There are three types of data in excel: values, labels, and dates/times.

Formula: a group of symbols that make a mathematical statement or a formula is a rule that describes the relationship of two or more variables or it is a mathematical equation that will calculate a result. Examples of simple formulas: $=a3-c6/d2$ or $=(b4+b5)*e7$. in spreadsheet formulas, normally we use the cell reference of the data rather than the data itself. all formulas must begin with an equal (=) sign. in other spreadsheet programs, such as lotus 1-2-3 and quattro pro, formulas begin with a plus (+) sign.

Basic mathematical operations used in spreadsheets include:

Symbol	description	example
--------	-------------	---------

(parenthesis	=C4*(B5+D7)
*	multiplication	=D8*E5
/	division	=A2/B9
+	addition	=(D8+E5)
-	subtraction	=(D8-E5)
%	percentage	=D7*18%
\wedge	exponential	=D7 \wedge 2

function: a function is a preset formula. like formulas, functions in excel begin with the equal sign (=) followed by the function's name and its arguments. the function name tells excel what calculation to perform. the arguments are contained inside round brackets and tell excel what data or other information to use in the calculation. for example, the sum function is one of the most commonly used functions in excel. it is used to add together the data in selected cells. the sum function is written as =sum (d1:d6). here the function adds the contents of cells d1 to d6 and stores the answer in the next cell d7.

name box: the name box is located next to the formula bar above the worksheet area. the name box displays the reference of the active cell. it will also show if a name has been assigned to a cell or range of cells. the name box can also be used to assign names to cells or ranges of cells.

formula bar: the formula bar in excel is located next to the name box above the worksheet area. the formula bar displays the data or formula stored in the active cell. it can also be used to enter or edit a formula, a function, or data in a cell.

labels: are text(s) that identify the data and help in organizing the worksheet.

values: are numbers to be used for calculation.

relative addressing: a relative formula is a formula that changes when copied to another cell. this is where a cell address (e.g. =B1+C1) is self-adjusted or changes when the formula is moved or copied to another cell (e.g. =B2+C2).

absolute addressing: it is a formula that does not change when copied. this kind of cell address is always fixed (e.g. \$B\$2).

starting a workbook

you will need to know how to insert text and numbers into excel workbooks to be able to use it to calculate, analyze and organize data. this is done by first creating a new workbook, inserting, editing and deleting text, navigating a worksheet, and saving an excel workbook. you can also edit text in a cell using the formula bar, double clicking within the cell and pressing F2.

navigating the worksheet

the first step in using the worksheet efficiently is to learn how to navigate it. you can move to other cells in a worksheet by using the keyboard keys and mouse.

the following keys can be used to navigate the worksheet in excel.

UNEБ 2013 Qn3 (a) Explain the following terms in a spreadsheet.

(i) Values (02 mark)

Values refer to numbers to be used for calculation.

(ii) Labels (02 mark)

These are text(s) that identify the data and help in organizing the worksheet.

(b) Name a symbol used when writing functions in a spreadsheet. (01 mark)

Equal sign (=), brackets

control keys	function
up arrow key	one cell up
down arrow key or press enter	one cell down
left arrow key	one cell left
tight arrow key or press tab	one cell right
ctrl + home	moves the cell pointer to cell a1 at the top of the sheet
ctrl + end	moves the cell pointer to the last cell that contains data
ctrl + right arrow key	moves pointer to the end of the row
ctrl + down arrow key	moves pointer to the end of the column
Home	moves the cell pointer to column a of the active row
shift + tab	moves the pointer to one cell left from the active cell
page up	moves the cell pointer to one screen up
page down	moves the cell pointer to one screen down
alt + page up	moves the cell pointer one screen width to the left
ctrl + page up	moves the cell pointer to the next worksheet

saving a workbook: you can save a workbook in many ways, but the two most common are as an excel workbook, which saves it with a 2007 file extension (xlsx), and as excel 97-2003 workbook, which saves the file in a compatible format with extension xls, so a person using earlier versions of excel can open the file.

adding and renaming worksheets:

the worksheets in a workbook are accessible by clicking the worksheet tabs just above the status bar. by default, three worksheets are included in each workbook. to add a new worksheet, click on the icon next to the last sheet displayed in the sheet tab or press shift+f11. to rename the worksheet, right click on the tab with the mouse and select rename from the shortcut menu and type the new name then press enter.

modifying columns, rows and cells: when you open a new, blank workbook, the cells, columns and rows are set to a default size. there is a possibility of changing the size of each, as well as to insert new columns, rows and cells as needed. columns are given by their width and row by their height.

when a new row is inserted, it will always appear above the selected row. select the entire row below where you want the new row to appear and not just the cell. if you select just the cell and then click insert, only a new cell will appear. the new column always appears to the left of the selected column. select the entire column to the right of where you want the new column to appear and not just the cell.

resizing rows and columns: you can resize a row by dragging the line below the row label you would like to resize and a column can also be resized in a similar manner by dragging the line to the right of the label corresponding to the column you want to resize. another way is by clicking format under the cells tab on the home ribbon.

selecting cells: before a cell can be modified or formatted, it must first be selected (highlighted). refer to the table below for selecting groups of cells.

cells to select	mouse action
one cell	click once in the cell

entire row	click the row label
entire column	click the column label
entire worksheet	click the whole sheet button
range of cells	drag mouse over the cells or hold down the shift key while using the arrow keys.

to activate the contents of a cell, double click on the cell or click once and press F2.

Formatting text: once you have entered information into a spreadsheet, you need to format it by using the bold, italic and underline commands; modify the font style, size and color; apply borders and color fill and also apply date and number formats.

format cells dialog box: for a complete list of formatting options, right-click on the highlighted cells and choose format cells from the shortcut menu or select the home ribbon and click on format from the cells tab.

number tab - the data type can be selected from the options on this tab. select general if the cell contains text and number, or another numerical category if the cell is a number that will be included in functions or formulas.

alignment tab - these options allow you to change the position and alignment of the data within the cell. font tab - all of the font attributes are displayed in this tab including font face, size, style, and effects.

border and fill tabs - these tabs allow you to add borders, shading, and background colors to a cell.

Date and time

if you enter the date "january 1, 2017" into a cell on the worksheet, excel will automatically recognize the text as a date and change the format to "1-jan-17". to change the date format, select

the number tab from the format cells tab. select "date" from the category box and choose the format for the date from the type box. If the field is a time, select "time" from the category box and select the type in the right box. Date and time combinations are also listed.

Entering the current date or time automatically: to enter today's date, press [ctrl] + [:], to enter the current time, press [ctrl] + [shift] + [:]

Creating simple formulas

Excel can be used to analyze numerical information. a formula is an equation that performs a calculation using values in the worksheet. This will allow you to create simple formulas using mathematical operators such as the addition, subtraction, multiplication and division signs.

Using cell references

There are many ways to create a simple formula in excel. most likely, you will choose one of the methods that enter the cell address into the formula rather than an actual number. the cell address is basically the name of the cell and can be found in the name box. when a cell address is used as part of a formula, this is called a cell reference because instead of entering specific numbers into a formula, the cell address is used to refer to a specific cell.

Working with cells

Information can be moved from one cell to another. this helps you find out various ways that will save you time and make working with excel easier. certain methods are more appropriate depending on how much information you need to move and where it will reside on the spreadsheet. Working with cells involves cutting, copying and pasting, dragging and dropping information as well as using the fill handle to fill a cell with data.

the fill handle doesn't always copy information from one cell directly into another cell. depending on the data entered in the cell, it may fill the data in other ways. for example, if you have the

formula =A1+B1 in the cell C1 and use the fill handle to fill the formula into cell C2, the formula doesn't appear the same in C2 as it does in A1+B1, you will see =A2+B2.

Printing workbooks

In excel, there are many things you can do to prepare your workbook for printing. Many of these tasks make it easier to format the spreadsheet for the printed page. With the printing option, one can learn how to view the spreadsheet in print preview mode, modify margins, change the page orientation and use the scale to fit feature, use the print titles command and also insert breaks. When you are in print preview mode, you can access many of the same features that you can from the ribbon; however, in print preview you can see how the spreadsheet will appear in printed format. The print titles command allows you to select specific rows and/or columns that will be repeated on each printed sheet. Imagine how difficult it would be to read page 48 of a spreadsheet if the column and row headings only appeared on the first page.

Creating complex formulas

Excel is a spreadsheet application intended to calculate and analyze numerical information such as household budgets, company finances and inventory. To do this you need to understand complex formulas that use multiple mathematical operators and those that use absolute and relative references.

Simple formulas have one mathematical operation. Complex formulas involve more than one mathematical operation. i.e. simple formula: =2+2 and complex formula: =2+2*8

To calculate complex formulas correctly, you must perform certain operations before others. This is defined below in the order of operations.

the order of operations: the order of mathematical operations is very important. if you enter a formula that contains several operations, excel knows how to work on those operations in a specific order given below:

operations enclosed in a parenthesis

exponential operations (to the power of)

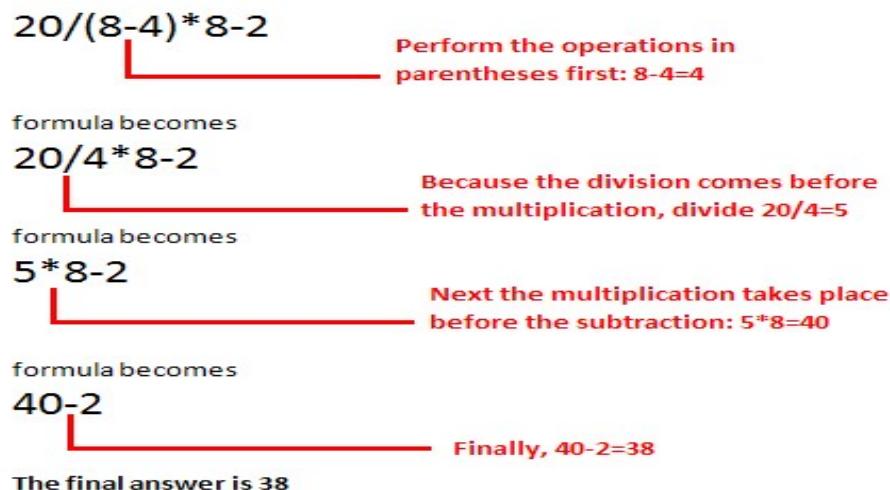
multiplication and division, whichever comes first

addition and subtraction, whichever comes first

note: create a mnemonic that can help you remember the order. i.e. please excuse my dear angelassengendo. (p.e.m.d.a.s)

example 1

using this order, the formula $20/(8-4)*8-2$ is calculated in the following breakdown.



example 2

3+3*2=? is the answer 12 or 9? well, if you calculated in the order in which the numbers appear, $3+3*2$, you'd get the wrong answer: 12. you must follow the order of operations to get the correct answer.

to calculate the correct answers

calculate $3*2$ first because **multiplication** comes **before addition** in the order of operations. the answer is 6.

add the answer obtained in step 1, which is 6, to the number 3 that opened the equation. in other words, add $3 + 6$.

the answer is 9.

before moving on, let's explore some more formulas to make sure you understand the order of operations by which excel calculates the answer.

4*2/4	multiply $4*2$ before performing the division operation because the multiplication sign comes before the division sign. the answer is 2.
4/2*4	divide 4 by 2 before performing the multiplication operation because the division sign comes before the multiplication sign. the answer is 8.
4/(2*4)	perform the operation in parentheses ($2*4$) first, and divide 4 by this result. the answer is 0.5.
4-2*4	multiply $2*4$ before performing the subtraction operation because the multiplication sign is of a higher order than the subtraction sign. the answer is -4.

excel automatically follows a standard order of operations in a complex formula. if you want a certain portion of the formula to be calculated first, put it in parentheses.

What is an absolute reference?

An absolute reference is the formula that does not change when copied to other cells. sometimes, when you copy and paste a formula, you don't want one or more cell references to change. Absolute cell references in a formula always refer to the same cell or cell range in a formula. if a formula is copied to a different location, the absolute reference remains the same. an absolute reference is designated in the formula by the addition of a **dollar sign (\$)**. it can precede the column reference or the row reference, or both. examples of absolute referencing include:

\$A\$2: The column and the row do not change when copied.

A\$2: The row does not change when copied.

\$A2: The column does not change when copied.

working with basic functions

a **function** is a **predefined formula** that performs calculations using specific values in a particular order. while you may think of formulas as being short mathematical equations, like $2+2$ or $f2*c2$, they can actually be very lengthy and involve complex mathematical calculations. one of the key benefits of functions is that they can save you time because you do not have to write the formula yourself. for example, you could use an excel function called average to quickly find the average of a range of numbers or the sum function to find the sum of a cell range. this helps us learn how to use basic functions such as sum and average, use functions with more than one argument, and access other excel functions.

the parts of a function: each function has got a specific order called a syntax, which must be strictly followed for the function to work correctly.

UNEBC 2017 Qn14(a) Give two reasons why an electronic spreadsheet application is suitable for preparing budgets(02 marks)

(b) state one use of each of the following application; (03 marks)

(i) Presentation software

(ii) Word processor

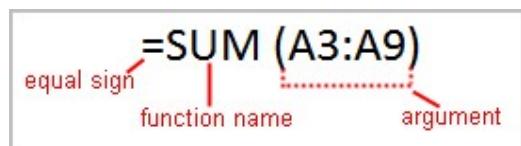
(iii) Communication software

syntax order:

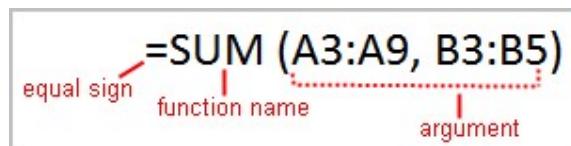
all functions begin with the = sign. after the = sign, define the function name (e.g., sum).

then there will be an argument. an argument is the cell range or cell references that are enclosed by parentheses. if there is more than one argument, separate each by a comma.

an example of a function with one argument that adds a range of cells, a3 through a9:



an example of a function with more than one argument that calculates the sum of two cell ranges:



excel's different functions

there are many different functions in excel. some of the more common functions include:

mathematical formulae	int (number)	rounds a no. down to the nearest integer
	abs (number)	returns the absolute value of a number

	ln(number)	calculates the natural logarithm of a number
	log(number, base)	calculates the logarithm of a no. to a specified base
	round(number, no. of digits)	rounds a number to a specified number of digits
	sqrt(number)	calculates the square root of a number
	sum(range)	calculates the total of a range of numbers
statistical formulae	average(range)	calculates the average value of a range of numbers
	count(range)	counts how many cells in the range have entries
	max(range)	returns the maximum value in a range of numbers
	min(range)	returns the minimum value in a range of numbers
	stdev(range)	calculates the standard deviation of a range of numbers.
logical formulae	if(logical test, value if true, value if false)	performs a test and returns one value if the result of the test is true and another value if the result is false
financial formulae	fv(rate, no. of periods, payment)	calculates the future value of an investment
	npv(rate, range)	calculates the net present value of an investment

		based on a discount
	pmt(rate, no. of periods, present value)	calculates the periodic payment for a loan based on constant payments & a constant interest rate
	pv(rate, no. of periods, payment)	calculates the present value of an investment
	rate(no. of periods, payment, present value)	calculates the periodic interest rate of an annuity (income)
date \$ time formulae	date	returns the current date
	now	returns the current date and time
	time	returns the current time

example of an autosum function: the formula, =sum(G2:G41), is called a function. the auto sum command automatically selects the range of cells from G2 to G41, based on where you inserted the function.

sorting, grouping, and filtering cells

a microsoft excel spreadsheet can contain a great deal of information. excel gives you the ability to analyze and work with an enormous amount of data. to most effectively use this data, you may need to manipulate it in different ways by sorting, grouping and filtering it in various ways that will enable you to most effectively and efficiently use spreadsheets.

sorting

sorting lists is a common spreadsheet task that allows you to easily reorder your data. the most common type of sorting is alphabetical ordering, which you can do in ascending or descending order. you can also be able to sort your data in reverse order.

filtering cells

filtering, or temporarily hiding, data in a spreadsheet allows you to focus on specific spreadsheet entries. filtering may look a little like grouping, but the difference is that you can filter on another field if you want to.

formatting tables

formatting your spreadsheet can not only make it look nicer but also easier to use. we discussed manual formatting options such as bold and italics now we can use the predefined table styles and some of the table tools. by default, the table will be setup with the drop down arrows in the header so that you can filter the table if you wish. when you apply a table style, filtering arrows automatically appear.

aligning text

one of the ways you can format your worksheet so it's easier to work with is to apply different types of alignment to text. this will help you center, right align text, merge and center cells, vertically align text and apply different types of text control. excel left aligns text (labels) and right aligns numbers (values). you can also define vertical alignment in a cell. information in a cell can be located at the top of the cell, middle of cell, or bottom of the cell.

changing text control

text control allows you to control the way excel presents information in a cell. there are two common types of text control: wrapped text and merged cells.

wrapped text wraps the contents of a cell across several lines if it's too large than the column width. it increases the height of the cell as well. merged cells can also be applied by using the merge and center button on the home ribbon.

working with worksheets

it is important that you know how to effectively manage your worksheets. by default three worksheets appear in each new workbook but you can add, rename, delete, group and ungroup worksheets. additionally you can freeze specific parts of the worksheet.

grouping and ungrouping worksheets

sometimes you will want to work with the worksheets one at a time as if each is a single unit. other times, the same information or formatting may need to be added to every worksheet. worksheets can be combined together into a group. grouping worksheets allows you to apply identical formulas and/or formatting across all of the worksheets in the group. when you group worksheets, any changes made to one worksheet will be changed in any other worksheets in the group.

freezing worksheet panes

the ability to freeze, or lock, specific rows or columns in your spreadsheet is called freezing panes. when you freeze panes, you select rows or columns that will remain visible all the time, even as you are scrolling. this is particularly useful when working with large spreadsheets.

using templates

a template is a pre-designed spreadsheet you can use to create new spreadsheets with the same formatting and predefined formulas. with templates, you don't need to know how to do the math, or even how to write formulas because they are already integrated into the spreadsheet.

using what-if analysis

the real power in excel lies in its ability to perform multiple mathematical calculations for you. what-if analysis allows you to see the effect that different values have in formulas.

what-if analysis tools

there are three what-if analysis tools that you can use.

goal seek is useful if you know the needed result but need to find the inputvalue that will give you the desired result.

scenario manager

data table

working with charts

a chart is a tool you can use in excel to communicate your data graphically or charts are a visual representation of data in a worksheet. charts make it easy to see comparisons, patterns and trends in the data. charts are linked to data on which they are based and are automatically updated whenever the data is modified.

the following types of charts can be created in excel.

column chart	7. doughnut chart
bar chart	8. radar chart
line chart	9. surface chart
pie chart	10. bubble chart
xy (scatter) chart	11. stock chart
area chart	12. cylinder, cone and pyramid charts.

column chart: is used when you want to display the change in data over a period of time and compare the items in groups. the items are organized horizontally (x axis) and values of the items organized vertically (y axis).

bar chart: is used to represent comparison between items of a group. the items are organized on y-axis and values on the x-axis. a bar chart is different from a column chart because the focus is on comparing values of items not on time i.e. comparison of sales values of items for two years.

line chart: is used to display the trend of data at various intervals of time.

pie chart: is used to display the size of an item in the selected data series. for example 20% of the total sales

xy (scatter) chart: is used to display the relationships between the numeric values in various data series. it is generally used to illustrate scientific data.

area chart: an area chart illustrates the magnitude of change over a period i.e. it can be used to plot a chart of all products of a company in all the regions of the country.

surface chart: used to find out the maximum number of combinations between two values.

doughnut chart: use to show the size of an item in a data series like a pie chart. here the difference being that unlike a pie chart more than one data series can be plotted using a doughnut chart.

stock chart: it displays the difference between the high, low, close values of an item in the stock market.

identifying the parts of a chart

source data: the range of cells that make up a chart. the chart is updated automatically whenever the information in these cells changes.

title: the title of the chart.

legend: the chart key, which identifies what each color on the chart represents.

axis: the vertical and horizontal parts of a chart. the vertical axis is often referred to as the y axis, and the horizontal axis is referred to as the x axis.

data series: the actual charted values, which are usually rows or columns of the source data.

value axis: the axis that represents the values or units of the source data.

category axis: the axis identifying each data series.

adding a header and footer

you can have only one custom header and footer on each worksheet. if you create a new custom harder of footer, it replaces the existing ones. to enter the additional text for the header or footer, enter the text in the left section, center section or right section box.

editing a graphic: activate the image you want to edit by clicking on it once. handles will appear around the graphic. click and drag these handles to resize the image. the handles on the corners will resize proportionally while the handles on the straight line will stretch the image.

linking worksheets

you may want to use the value from a cell in another worksheet within the same workbook in a formula. for example, the value of cell a1 in the current worksheet and cell a2 in the second worksheet can be added using the format "sheetname!celladdress". the formula for this example would be "=a1+sheet2!a2" where the value of cell a1 in the current worksheet is added to the value of cell a2 in the worksheet named "sheet2".

examples of data types of entries in spreadsheets

number

general

currency

date/time

fraction

accounting

text

special

note:

#name? - means the formula is referencing an invalid name.

#value- you have used a wrong type of operand

#ref! - excel can't locate the referenced cell

#num - incorrect use of number

#null - reference to intersection of two areas that do not intersect

#div/0!- a number is divided by zero or when a formula refers to a cell that has 0 or is blank.

UNEB 2015 Qn 18 The table below shows a worksheet which Nabirye was working on.
Use it to answer the questions that follow.

	A	B	C	D	E
1	ID Number	Name	Item 1	Item 2	
2	100000	Akello	990	34	29.1
3	100002	Nambi	660	56	11.8
4	#####	Busingye	880		DIV/o!
5			#NAME?		*
6					

- (a) (i) Suggest a reason why the entry in cell A4 appeared as shown.(01 mark)
It shows ##### because the values are not fitting in the cell

(ii) How do you rectify the error in cell A4? (01 mark)

The error can be rectified by widening the column A

(b) What does the error in cell E4 mean?(01mark)

It means that the value cant be divided by a zero

, (02 marks)

How do you correct the error in cell C5?

(01 mark)

INTERNET

&

WORLD WIDE WEB

(WWW)

Chapter contents

Introduction to internet

History of internet

Internet services

World wide web

Chapter questions

With the prominence of the Internet in our personal and professional lives today, it is hard to believe that there was a time not too long ago that few people had even heard of the Internet, let alone used it. But technology is continually evolving and, in fact, it is only relatively recently that it has evolved enough to allow the use of multimedia applications—such as downloading music and movies, watching TV and videos, and playing multimedia interactive games—over the Internet to become everyday activities. Today, the Internet and the World Wide Web are household words, and, in many ways, they have redefined how people think about computers, communications, and the availability of news and information.

Despite the popularity of the Internet, however, many users cannot answer some important basic questions about it. What makes up the Internet? Is it the same thing as the World Wide Web? How

did the Internet begin, and where is it heading? What is the most effective way to use the Internet to find specific information? This chapter addresses these types of questions and more.

The number of users of the internet is exponentially growing due to increasing ease of use, low cost of the hardware and availability of adequate facilities in schools, public libraries, internet cafes etc.

Although the basic use of internet was research, the number of users of e-mail has outgrown that of research. One can use the internet to communicate with anyone else online, in any place in the world without incurring any extra cost. It can also be used to join mailing list, bulletin boards or discussion groups that cover a huge variety of subjects.

The Internet is an international network of networks that connects computers worldwide.

It connects universities, research facilities, governmental organizations, businesses, non-profit making organizations and individuals, allowing them to access, share and exchange information.

Objectives of this chapter

After completing this chapter, you will be able to do the following:

Discuss how the Internet evolved and what it is like today.

Identify the various types of individuals, companies, and organizations involved in the Internet community and explain their purposes.

Describe device and connection options for connecting to the Internet, as well as some considerations to keep in mind when selecting an ISP.

Understand how to search effectively for information on the Internet and how to cite Internet resources properly.

List several ways to communicate over the Internet, in addition to e-mail.

History of internet.

In 1969, research bodies in USA called Advanced Research Project Agency (ARPA) setup a computer network and named it ARPA net. It was built to serve two purposes; the first was to share research among military personnel and civilian researchers to communicate about research projects.

Connecting to the internet

To get connected to the internet you need to link your computer to the host computer through a network adapter. A host computer is made available using IP address or domain name through an Internet Service Provider (ISP).

IP Address is a number that identifies a computer on the network or internet. E.g 192.168.243.1

IP Addresses and Domain Names IP addresses and their corresponding domain names are used to identify computers available through the Internet. IP (short for Internet Protocol) addresses are numeric, such as 207.46.197.32, and are commonly used by computers to refer to other computers. A computer that hosts information available through the Internet (such as a Web server hosting Web pages) usually has a unique text-based domain name (such as microsoft. com) that corresponds to that computer's IP address in order to make it easier for people to request Web pages located on that computer. IP addresses and domain names are unique; that is, there cannot be two computers on the Internet using the exact same IP address or exact same domain name.

To ensure this, specific IP addresses are allocated to each network (such as a company network or an ISP) to be used with the computers on that network, and there is a worldwide registration system for domain name registration. When a domain name is registered, the IP address of the computer that will be hosting the Web site associated with that domain name is also registered; the Web site can be accessed using either its domain name or corresponding IP address. When a Web site is requested using its domain name, the corresponding IP address is looked up using one of the Internet's domain name system (DNS) servers and then the appropriate Web page is displayed. While today's IP addresses (called IPv4) have 4 parts separated by periods, the newer

IPv6 addresses have 6 parts separated by colons in order to have significantly more unique addresses. The transition from IPv4 to IPv6 is necessary because of Domain names typically reflect the name of the individual or organization associated with that Web site and the different parts of a domain name are separated by a period. The far right part of the domain name (which begins with the rightmost period) is called the top-level domain (TLD) and traditionally identifies the type of organization or its location (such as .com for businesses, .edu for educational institutions, .jp for Web sites located in Japan, or .fr for Web sites located in France). The part of the domain name that precedes the TLD is called the second-level domain name and typically reflects the name of a company or an organization, a product, or an individual. There were seven original TLDs used in the United States; additional TLDs and numerous two-letter country code TLDs have since been created and more are in the works. More than 250 million domain names are registered worldwide.

ISP (internet service provider)

This is a company that provides direct connection and access to the internet services for a monthly fee. Some of the ISP in East Africa are: Uganda Telecom, MTN, Warid Uganda, Broad band company, Africa online, Afsat, Swiftkenya, etc

Factor to consider when choosing isp.

- ✍ Inquire about their setup costs, monthly charge/cost and cost of other requirements used in connecting.
- ✍ The ISP software should be compatible with your computer system.
- ✍ Inquire about the speed of the Modem and check whether it matches with the speed of the computer(s) otherwise data transfer will be slow
- ✍ Ask how long the ISP has been in business
- ✍ Ask how long it takes for them to connect you.
- ✍ Inquire if they have online e-mail help in case one is not a computer expert.

The most common methods to connect to the internet

- ★ Dial-up connection
- ★ Dedicated connection (through ISDN or ASDL)

Dial-up connection. Works over standard telephone lines. To connect to the internet, your computer dials its modem and then connects to a modem attached to a computer belonging to your ISP via the telephone line.

A dial up connection to the internet involves the following steps;

- Ensure that you have a standard telephone line

Dedicated connection: This means that a user has permanent connection of internet services at all times.

Basic requirements for internet connection

- ✍ Computer with good specifications i.e. processor speed, RAM capacity with NIC
- ✍ Modem in case of Dial-up connectivity
- ✍ Communication Software (NOS)
- ✍ Communication Media and devices (cables, hubs, switch,)
- ✍ Internet Service Provider (ISP)

UNEБ 2014 Qn 6 (a) State any two adverse effects of using internet for business and communication. (02 marks)

b) Suggest the most appropriate internet communication service in the following services.

- i. Online meetings between two company employees in geographically separated regions.(01 mark)
- ii. Instant and real time communication between friends.(01 mark)
- iii. Typed views on an on-going online discussion amongst a specific group of people.

Uses of internet

1. **Research:** internet provides access to a vast amount of research material including resource from libraries, research institutions. it lets the user to search through reference materials like online encyclopedia, magazines, catalogs.

2. **Business:** internet provides various business facilities such as e-commerce where by many companies today use internet to sell and buy goods and services on.
3. **E-learning:** internet provides a distance education and home schooling through a process known as virtual reality. Learning through interaction with special programs on the computer is called electronic learning.
4. **Mass media:** with internet you can expect to get latest news were by most of the major root sites are updated throughout the day. Some of the news sites include bbc, cnn, aljazeera, sports zone, bukedde, new vision e.t.c.
5. **Health:** internet provides latest medical news and research; it provides the patient with medical information about the different diseases.
6. **Entertainment:** it's also possible to listen to music on the web and to watch video clips if your computer is multimedia.
7. **Down loading:** it is possible for a user to download software, pictures, music files, video clips from the web and this is possible for the computers connected to the internet.

UNEB 2013 Qn 8 (a) state two internet based tools that support web based research (02 marks)

Mozilla Firefox, Google Chrome, safari

(b) Identify three things one would require in order to get connected to the Internet.(03 marks)

Internet Service Provider,

NIC(Network Interface Card),

Modem , DSL(Digital subscriber line)

UNEB 2013 Qn 9. Outline five factors which determine data transmission speeds over the internet. (05 marks)

The distance the data travels.

The media in which the data travels

The equipment used by the service provider

The processing speed of the server

The traffic which comes across the server

UNEB 2017 Qn 18 Outline five ways in which a student can use the internet(05 marks)

Internet services

Worldwide Web (www)

Definition: www refers to the collection of web pages available through the internet.

The World Wide Web or also simply called “the web” is a multimedia service that runs the internet.

That is, it interconnects system of sites or servers all over the world that can store information in a multimedia form i.e. sound, photo, video, and text.

UNEB 2015 Qn 9(a) what is the World Wide Web? (02 marks)

(b) Show three ways in which the Internet can facilitate trade and business.(03 marks)

Online banking

It now possible to bank your money in the bank by the use of computers without you going physical to the bank and this has helped to avoid congestion.

Online banking is a banking service via internet whereby the customers of the bank can access their accounts using the web instead of visiting the bank's branches.

Advantages of online banking

- customers can access their accounts at any time
- Customers can meet their bills automatically such as water bills, electricity bills by direct debits in advance.
- Low charges encountered by customer since the cost to banking services are much less.

- There is an immediate reply of messages or complaint sent by the customer without visiting any branch.
- It completely reduces congestion at the bank branches.

Main disadvantage

- Thieves may obtain your banking details by **phishing**, which is sending a customer an e-mail asking for his/her bank details as if it has been sent by the bank.

Online shopping

Online shopping is increasingly popular in some developed countries, where one can order goods online and pay for them using a credit or debit card. The goods will be delivered to the address specified by the customer.

Advantages of online shopping

- > Shopping is convenient and is done at any time of the day.
- > No need of visiting shop after shop looking for required goods.
- > One can still shop regardless of bad weather.
- > It is helpful to people who are disabled or hand capped.
- > It is flexible since one can acquire goods as far as abroad.
- > There is much greater potential market online.
- > Goods online are globally advertised.

UNEБ 2017 Qn 20(a) Give any two services that use E-payment method (02 marks)

(b) State three advantages of using E-payments over traditional methods (03 marks)

Electronic discussion forum

These include: mailing list, newsgroups/bulletin board, chat rooms

Mailing list is a group of people using e-mail to communicate their views on common issues or interest by subscribing to be a member.

Newsgroup or bulletin board enables group of people to discuss on specific Chapters, where by the subscribers of newsgroup can post the messages on the internet for all users to access.

Chatting on the net

People can sign into chat room and exchange ideas freely. Chat rooms are group of people with common interests exchanging idea with one another in real time. Different ways of chatting include;

- ✍ **Text based chat:** when one enters a chat room is identified by a name to other members in a discussion. He/she can participate on posted comments.
- ✍ **Internet relay chat (irc):** this is a real-time conference system that discusses/chats on specific Chapters that suits your interest using text messages.
- ✍ **Instant messaging:** one chats privately with another using a mixture of e-mail and mobile phone messages.
- ✍ **Multimedia chat:** one can now chat using a microphone on a computer to talk to another via internet.

UNEBC 2013 Qn 18 From the given terminologies used for Internet and Networks below, choose the correct one to complete each of the statements that follow.

- **A discussion group.**
- **Instant messaging.**
- **Video Conferencing.**
- **A Chat room.**
- **Online shopping.**
- **Telephony.**

- (a) **The type of Internet communication that allows multiple users to exchange messages in real time is called** A chat room(01 mark)
- (b) **The type of Internet communication that enables individuals to post messages on a particular topic for others to read and respond to is called**
- A discussion forum(02 marks)

(c) **The use of multimedia technologies in communication is called (02 marks)**

Video conferencing



Telnet

This is an internet feature that allows micro computer users to connect (logon) to remote computers as if they were directly connected to those computers.

Gopher

Gopher is an old browsing tool or internet program that allows users to use a system of menus to browse through and retrieve (open) files stored on different computers.

It has been replaced with hyperlinks.

Internet addresses

Internet addresses are used to identify an individual or resource on the network. Each internet address must be unique; therefore the internet's addressing scheme was developed in 1984 and is called **domain name scheme (DNS)**.

Types of internet addresses

E-mail address.

Web address.

E-mail address

An e-mail address directs the computer on the internet to the destination of the e-mail message. a typical e-mail should look like this:

jorambwambale@gmail.com

1. **jorambwambale** is a user name or user id; it is created by the user during e-mail account registration.
2. @ is a symbol for “at”, it separates the user name from domain name.
.com is a domain name of the host computer i.e. the computer on which the e-mail account is hosted or located.
3. the period “.” is read as dot and it separates the domain name components
4. **com** is a domain type that identifies the type of institution offering a particular service, meaning commercial institution.

UNEБ 2015 Qn 15. Identify the following from the email address rob crt@yahoo.com

- a) (i) Domain name.....
(ii)Username
(iii) Top level domain name

Other common domain types are;

.com commercial institution.

.co company.

.edu education institution.

.gov government institution.

.org organization.

.mil military organization

.net host network

Uniform resource locator (URL)

A Uniform Resource Locator (URL) *uniquely identifies a specific Web page* (including the protocol or standard being used to display the Web page, the Web server hosting the Web page, the name of any folders on the Web server in which the Web page file is stored, and the Web page's filename, if needed).



The most common Web page protocols are Hypertext Transfer Protocol (http://) for regular Web pages or Secure Hypertext Transfer Protocol (https://) for secure Web pages that can safely be used to transmit sensitive information, such as credit card numbers. File Transfer Protocol (ftp://) is sometimes used to upload and download files. The file extension used in the Web page filename indicates the type of Web page that will be displayed (such as .html and .htm for standard Web pages created using Hypertext Markup Language, as discussed in Chapter 10). For example, looking at the URL for the Web page shown in Figure 1-23 from right to left, we can see that the Web page is called index.html, is stored in a folder called jobs on the Web server associated with the twitter.com domain, and is a secure Web page because the https:// protocol is being used.

Accessing internet

The internet is accessed through application software called **web browser**.

Webbrowser: is software that enables a person to access information available on the web. **Or** it is software that translates **html** documents and allows you view web pages on the screen.

Examples of popular web browser are;

- ✓ Microsoft internet explorer,
- ✓ Netscape navigator
- ✓ Mozilla fire fox
- ✓ Opera

- ✓ Google chrome

Surfing the web

Surfing or browsing the web is the process of accessing internet resources like the web pages and websites. Mainly using hyperlinks and search engine.

Hyperlinks: these are underlined or highlighted texts on the website page that indicate links to other sites. Hyperlink can be identified by the fact that the mouse pointer changes to hand icon when it passes over it. a picture that used as hyper link is called **hotspot**.

Searching the web

There various tools that can be applied to find or search information on the web, namely;

- **directories**

These are lists of websites classified by Chapters, e.g. yahoo directory provides a list of broad categories of information and services.

- **Search engine**

This is a search tool that allows the user to find specific documents through key-word search or menu choices.

It has a special program called **spider** that traverses the web from one hyperlink to the next and new material is found that is added to their indexes or databases. The user search for a word by typing few words in the search field of the search engine.

Examples of search engines are: google,msn,bing.

Electronic mail (e-mail)

E-mail refers to the sending and receiving of electronic messages (text, sound, video and graphics) on the internet. It is now the most popular and widely used service on internet.

UNEБ 2014 Qn15 Explain why an organization would prefer use of Electronic Mail (E-mail) over ordinary mail.

Advantages of e-mail over traditional ordinary mails

- ✍ **Speed:** e-mail is much faster than mail delivered by the traditional postal system. an e- mail can be sent in any part of the world in a matter of minutes.
- ✍ **Expense:** apart from fixed monthly subscription fee to internet service provider (isp) for internet service e-mail services are free.
- ✍ A sender can send as many e- mails as he/she likes without extra charge unlike in the traditional postal mail a sender is charged per letter.
- ✍ **Feedback:** data transmitted is confined to its destination hence user is convinced of his/her messages unlike ordinary mail were user is uncertain.
- ✍ **Real-time:** the e-mail is convenient and time saving when sending same e-mail to many recipients in real time.
- ✍ **Available 24hrs** one can access the e-mail anywhere at any time of the day, unlike the traditional mail which has a specific time of operation.
- ✍ **Attachments:** it supports multimedia attachment such as big documents, video, music graphics.

UNEБ 2016 Qn 14(a) Give three benefits for sending documents using email service. (03 marks)

(b) State two benefits for sending documents using ordinary post.(02 marks)

Disadvantages of e-mail over ordinary post mail

- ❖ **Expensive:** in case of initial cost setting up the network and internet. It is more expensive than traditional mail which requires buying a stamp for postage.

- ❖ **Needs a media to be delivered:** e-mail can only be accessed through a computer device that is connected to a network or internet.
- ❖ e-mail may be corrupted by a computer virus hence it may not open
- ❖ **It doesn't support the sending of parcels.** Physical items can't be sent with e-mail while with post, one can.
- ❖ E-mail favors one who knows how to use the computer while post favors only those who can write.

E-mail facilities

- **E-mail server:** this is a computer that receives incoming messages and delivers outgoing messages. It allocates a certain amount of storage to hold mail for registered user called **mailbox**.
- **Mail client:** this is a program that enables the user to read and compose e-mail messages, send and access e-mail from the server, e.g. MS outlook express.

UNEБ 2016 Qn 16(a) Distinguish between a hyperlink and home page (02 marks)

(b) Identify three netiquette guidelines while using the internet (03 marks)

Checking an e-mail message

In order to check mail the user has to open his/her e-mail account by providing

1. user name
2. Password which is a secret code that gives users access to their e-mail accounts.

To compose a message.

Simply click the **compose** button. A blank screen opens on which you can type the new message.

Sending an e-mail message

To send an e-mail:

- ✓ **To:** text box: - is a field in the e-mail header where the sender types in the correct e-mail address of the recipient.
- ✓ **cc: (carbon copy)** textbox: - is a field in an e-mail header that enables one to send a copy of the e-mail to other people and each recipient will view all the addresses of other recipients.
- ✓ **bcc (blind carbon copy)** textbox: - is a field in an e-mail header that enables a sender to send a copy of an e-mail to other recipients but each recipient cannot view e-mail address of the other recipients.
- ✓ **Subject:** textbox: - is a field where a sender enters a phrase that describes what an e-mail is about.
- ✓ Type the message and finally click the **send** button.

Forwarded messages can be read and sent to other people. Most of such messages are fun pages, poems, e-cards, gifts etc after reading you further forward to people by simply click forward button and then provide the addresses of the recipients. Then click send button to send.

UNEБ 2014 Qn 20 using the email address: anne@gmail.com, identify what these parts stand for:

- a) anne (01 mark)
- b) @ (01 mark)
- c) gmail (01 mark)
- d) .com (02 marks)

UNEБ 2013 Qn 19(a) Explain the following terms as used in electronic mail.

(i) **Blind Carbon Copy (BCC).**

This means sending a copy of an e-mail to other recipients but each recipient cannot view e-mail address of the other recipients.

(ii) **Carbon Copy (CC).**

This means sending a copy of the e-mail to other people and each recipient will view all the addresses of other recipients

(b) State one requirement needed for one to send an email.

Internet

File attachment

You can also send attachments along with the original e-mail. An attachment can be a word processed document, spreadsheet file, a database file, picture, sound or video file

To attach a file

- in the mail client window i.e. MS outlook express
- click new or compose button
- specify the recipient's address and the subject
- click the attach files button then a dialog box appears, where files are browsed from their location and scanned for attachment

UNEБ 2017 Qn 16(a)State three advantages of using e-mail services over sending mail by post(03 marks)

(b)State two advantages of post mail services over email communication (02 marks)

Note:

The following terms may be used while using and interacting with internet;

- ☞ **Portal.** This is a webpage chosen as a browser home page, typically can be customized to display personalized content.
- ☞ **Web-based training.(WBT)** refers to instruction delivered on an individual basis via the web.
- ☞ **Distance learning.** Refers to a learning environment in which the student is physically located away from the instructor and other students, commonly instruction and communications take place via the web.

- ☞ **Blog.** A webpage that contains short, frequently updated entries in chronological order, typically by just one individual.
- ☞ **A wiki.** A collaborative webpage that is designed to be edited and republished by a variety of individuals.
- ☞ **E-portfolio.** A collection of an individual's work accessible via the web.
- ☞ **Cookie.** A small file stored on a user's hard drive by a web server, commonly used to identify personal preferences and settings for that user.
- ☞ **Spyware.** A software program that is installed without the user's permission and that secretly gathers information to be sent to others.

Chapter questions

1(a) Explain what is meant by the term *internet* (02 marks)

(b) Briefly describe the following internet protocols (03 marks)

(i) TCP/IP

(ii) HTML

(iii) Http

2 Mention five services offered by the *internet* (05 marks)

3 Today *internet* is becoming part of the human life.

(a) Describe any three positive effects of the *internet* to society (03 marks)

(b) State any two negative effects of *internet* to the society (02 marks)

4 (a) identify three requirements needed for an *internet connection* (03 marks)

(b) The *internet* has various uses in business

(i) State one advantage of using *Email* in business (01 mark)

(ii) Mention one other use of *internet* besides *email* (01 mark)

5 Give five factors that lead to a slow *internet speed* (05 marks)

6 (a) What do you understand by *internet service provider* (02 marks)

(b) Give three examples of ISPs in Uganda today (03 marks)

7 Briefly describe the following as used in internet (05 marks)

(a) URL (b) Uploading (c) Downloading (d) Surfing (e) online meetings

8 with an example, describe the main parts of an email address (05 marks)

9 (a) Distinguish between sign in & Sign up as used in emails (02 marks)

(b) State three examples of email software(03 marks)

10 (a) Define the term protocol as used with the internet (02 marks)

(b) Mention any three protocols used on the internet (03 marks)

11 . State the function of the following fields as used in emails (05 marks)

(i) To

(ii) Subject

(iii) Carbon copy

(iv) Blind carbon copy

(v) Attachment

12 (a) Write the acronym ISP in full (01 mark)

(b) State any four services provided by ISPs(04 marks)

13 The use of email is becoming so popular as a communication method.

(a) Mention any three advantages of email software over the other traditional methods of communications such as the postal system (03 marks)

(b) What are the two disadvantages associated with the use of emails as a communication method (02 marks)

14 Explain the following terms as used in electronic mail. (05 marks)

(vi) Compose

- (vii) *Inbox*
- (viii) *Sign out*
- (ix) *Forward*
- (x) *Check mail*

15 (a) mention three factors to consider when choosing a suitable ISP (03 marks)

(b) Give any two features of the electronic mail (02 marks)

16 Describe the following internet communication services (05 marks)

- i. *Email*
- ii. *Chatrooms*
- iii. *Mailing lists*
- iv. *News groups*
- v. *Internet forums/ message boards*

17 (a) what is a domain name? (01 mark)

(b) State four top domain names (04 marks)

18 (a) Explain the term world wide web (02 marks)

(b) Describe the popular types of E-commerce carried over the internet.(03 marks)

19(a) Distinguish a web browser from a URL (02 marks)

(b) List three examples of web browsers you know (03 marks)

20 Explain these terms as used in the world wide web (05 marks)

- (i) *Surfer*
- (ii) *Web portal*
- (iii) *Browsing*
- (iv) *Newsgroups*

(v) VoIP

21 (a) Explain what is meant by internet telephony? (02 marks)

(b) Mention three different ways internet telephony can be used (03 marks)

22(a) Explain the term telecommuting (02 marks)

(b) State three technological requirements supporting telecommuting (03 marks)

CHAPTER9: INTRODUCTION TO PRESENTATION SOFTWARE

Communicating effectively to a big audience is a challenge to many people. . It should be noted however that versatility of ICTs has played a big role in enhancing the ease and impact of the presentation process. A presentation program is supposed to help both the presenter with a range of tools to clearly structure his ideas and offer the participants with multimodal information that is engaging. There are many areas where presentations are used. Some of these include professional (work-related), education, entertainment, and for general communication. Presentation program can either supplement or replace the use of older visual aid technology, such as pamphlets, handouts, chalkboards, flip charts, posters, slides and overhead transparencies.

Objective

You should be able to create and deliver a multimedia presentation.

Definition of presentation software

This is the type of software used to create presentations which can communicate ideas and other information to a group or audience

Or

It is a software program that helps you to organize and present information too an audience.

The presentation can be viewed as a slide show on a large monitor or a projection screen.

It is application software that enables the user to create computer based slide shows using graphics and animations to enhance images.

A presentation is the collection of slides, handouts, speaker notes, sounds and videos organized in a single file.

A slide is a single page of a presentation created in PowerPoint. The best presentations use approximately ten to twelve slides to get the message across.

Examples of presentation software

Microsoft PowerPoint, Harvard graphics, Magic point, ShowLogic, Adobe persuasion, Corel Presentations, Apple keynote, Lotus Freelance Graphics, Songpro, Zoho, Worship, Scala multimedia, Macromedia action, HyperCard, Author stream, Screen cast, K presenter, Match ware mediator, etc.

Characteristics of presentation software

It has the ability to add sounds and graphics to enhance the presentation.

Presentation software contains design templates which define how the presentation will look like.

It has the ability to run the slides automatically.

It deals with slides rather than pages in data presentation.

It contains the wizards that help the user through the process of creating the presentation.

Functions of presentation software

They are used for visual aid communication

Used for summarizing content for presentation

Are used in advertisements as a means of attracting customers.

It helps in computer aided learning where by students can easily read and take the notes without teacher's instructions

They help in making illustrations that can make the audience easily understand a certain presentation.

UNEБ 2017 Qn 15(a) Name one examples of a presentation software(01 mark)

(b) Give the importance of each of the following features used in electronic presentation;

(i) Master slide

(ii) Transitions

PRESENTATION BASICS

PowerPoint includes all the features you need to produce professional-looking presentations.

When you create a PowerPoint presentation, it is made up of a series of slides. The slides contain the information you want to communicate with your audience. This information can include text, pictures, charts, video, sound, and more. Before you begin adding information to slides, you need to know the basics of working with slides like starting a new presentation, inserting new slides, modifying a layout, moving and copying slides, how placeholders work, as well as how to save your presentation.

Slide basics

Slides contain placeholders that can contain many different items including text, pictures, and charts. Some placeholders have placeholder text, or text that you can replace, and thumbnail-sized icons that represent specific commands such as Insert Picture, Insert Chart, and Insert Clip Art.

Slide layouts

This is the arrangement of all the items that make up a slide such as title, graphics or text boxes. OR these are the layouts that contain positioning, formatting and place holders for all the content that appears on a slide. The placeholders are arranged in different layouts that you can select when you insert a new slide or that can be applied to existing slides. A slide layout arranges your slide content. Layouts contain different types of placeholders that you can use depending on what information you want to include in your presentation. Each layout has a descriptive name, but the image of the layout shows you how the placeholders are arranged on the slide.

Using different views from the PowerPoint window

In the bottom, right corner of the PowerPoint window are three view commands. From here, you can change the view to Normal, Slide Sorter, or Slide Show view by just clicking a command.

Normal is the default view and where you will create and edit your slides in the center slide pane and all the slides will appear on the slides tab in the left task pane.

Slide Sorter is a view of your slides in thumbnail form. The slides are presented horizontally, which allows you to see more slides at a time.

Slide Show view fills the computer screen with your presentation so you can see how the presentation will appear to the audience.

Saving your presentation

If you are saving a presentation for the first time, you will need to use the Save As command; however, if you have already saved a presentation, you can use the Save command for any changes made in the presentation.

Text basics

It is important to know how to perform basic tasks with text when working in PowerPoint i.e. basics of working with text including how to insert, delete, select, and move text, as well as how to work with text boxes. Text in both placeholders and text boxes can be formatted using the same commands.

OTHER FONT COMMANDS

Increase Font Size command increases the font size of the selected text to the next standard font size.

Decrease Font Size command decreases the font size of the selected text to the next standard font size.

Clear All Formatting command removes your recent formatting changes.

Strikethrough command makes a line through the text.

Text Shadow command adds a drop shadow to text.

Change Case commands lets you try different capitalization options without having to delete and retype letters or words.

Text Alignment options:

Align Text Left: Aligns all the selected text to the left margin.

Center: Aligns text an equal distance from the left and right margins.

Align Text Right: Aligns all the selected text to the right margin.

Justify: Justified text is equal on both sides and lines up equally to the right and left margins.

Text boxes

In addition to inserting text in placeholders, you can also insert text into text boxes. Text boxes allow you to add to the predefined layouts so that you can place text wherever you want on a slide.

Moving Text: To move text means to copy, cut and paste, to drag and drop text.

Themes and background styles

A theme is a predefined combination of colors, fonts, and effects that can be applied to your presentation. PowerPoint includes built-in themes that allow you to easily create professional-looking presentations without spending a lot of time formatting. Each theme has additional background styles associated with it that can be applied to the slides to modify the theme such as theme colors, theme fonts, and theme effects, as well as applying a background style.

When you create a new presentation in PowerPoint there is a theme applied even though the slide background is white. This default theme is called the Office Theme. You can apply a different theme to your slides before you add text or make changes to the default slide. An advantage of doing this is that the location of the text will not move. If you apply the theme after you enter text on the slides, the text boxes and placeholders may move depending on the theme you choose. The only advantage of entering some of your text before applying a new theme is that the live preview feature allows you to see how the themes will affect your specific text.

Modifying themes

You can also modify the current theme colors, fonts, and effects. For example, if you like a certain theme, but would prefer to use more of the given color in the presentation, you can change the colors of the theme and create a new, custom theme. PowerPoint themes are powerful because they allow you to create professional-looking slides easily. The option to modify these themes makes it an even more robust and powerful tool because you can customize the themes based on your needs and preferences.

Background styles

Background styles can be added to your slides after a theme is applied. The styles are fill variations based on theme colors. When you switch to a different theme, the background styles are updated based on the new theme colors. The background style options for the one theme are different from the background style options for another theme. The colors are different based on the theme colors.

Pictures and clip art

On each slide you create in your presentation, you have information that you want to communicate with the audience. You can do this with text and illustrations, such as pictures and clip art by knowing how to insert a picture and clip art, and how to modify both types of illustrations. Pictures and clip art can be inserted from the Ribbon and by using the commands that appear in certain placeholders. In both methods, the image is placed in the middle of any selected slide placeholders. PowerPoint provides you with several commands that allow you to modify pictures.

When you select a picture, a Picture Tools Format tab appears on the Ribbon. You can apply picture styles, change shape of a picture, add borders to a picture, crop a picture and also compress a picture. All of the tools that can be used to modify pictures can also be used to modify clip art images.

Other picture tools include: -

Change Picture command: Select a new picture from your computer.

Reset Picture command: Revert to original picture.

Brightness command: Adjust the brightness of the picture.

Contrast command: Adjust the contrast of the picture from light to dark.

Recolor command: Modify the color in a variety of ways including black and white, sepia, pink, purple, and more.

Working with lists

Bulleted and numbered lists can be used in your presentation to arrange and format text on slides to draw emphasis to specific information. Lists can often be easier for the audience to read than paragraphs of text on a slide.

Some slide layouts include a content placeholder where you can add text, or use graphical commands to insert tables, charts, SmartArt graphics, pictures, clip art, and media clips. If you choose to add text, rather than using one of the graphical commands to insert an item, the text is formatted into a list by default. The default bullet style and color is determined by the theme. When dealing with bulleted lists, you can change the bullet color, bullet style, bullet size, and also use a picture and a symbol as a bullet. The way you format a bullet, is the same way numbered lists are formatted.

Proofing slides

PowerPoint provides several proofing features that will help you produce a professional, error-free presentation. You can choose to ignore an underlined word, add it to the dictionary, or go to the Spelling dialog box. Once the word is added to the dictionary, it will not appear underlined when it is used again.

Other Proofing Commands includes

Research: Helps to search for information about words or phrases from dictionaries, encyclopedias, and other material.

Thesaurus: This is used to identify words that have a similar meaning to another word.

Translate: This tool translates text from one language to another.

Language: Sets the language as desired.

Viewing and printing slides

PowerPoint gives the ability to view the presentation in four different ways, depending on what task you are completing. For example, if you will be using your slides to talk to an audience, which is how PowerPoint is often used, you may want to practice your presentation and view your slides in slide show view. You may also want to print copies of the slides, either for yourself, or for people viewing your presentation. You have several printing options that are specific to PowerPoint.

Slide Views: The slide view is where you view your presentation in Normal view.

Normal View: This view is where you create and edit your slides. You can also move slides in the Slides tab on the task pane on the left.

Slide Sorter View: Miniature slides are arranged on the screen in this view. You can drag and drop slides easily to reorder them, and see more slides at one time. This is a good view to use to confirm that you have all the needed slides and that none have been deleted.

Slide Show View: This view fills the computer screen with a slide and is what the audience will see when they view the presentation.

The Slide Show Menu

Arrows: The forward arrow displays the next slide and the back arrow displays the previous slide.

Menu Icon: This gives you the option to move to the Next or previous slide, jump to a specific slide, change your screen options, or end the show.

Pen Icon: Allows you to change your cursor to a ball point pen, a felt tip pen, or a highlighter, and choose the color of the pen. This allows you to annotate your slides and make notes while you present to an audience.

Notes Page View: Notes Page view provides a space for presentation notes, often called speaker notes. The notes can be added to the presentation from this view. You can enter your speaker notes directly into the text placeholder in Notes Page view, or in Normal view.

Handout master: Shows the arrangement of handouts for slides that are printed per page plus the arrangement for printing outlines.

WordArt and shapes

There are many features and commands you can use in PowerPoint to create visually appealing slides. Two of these features are WordArt and shapes. WordArt allows the user to create stylized text with textures, shadows, outlines, and more. It can be applied to text on any slide. Additionally, you can insert a variety of shapes such as lines, arrows, callouts, stars, and basic shapes including rectangles and circles. You can use WordArt to create stylized text that is eye-catching and professional; however, with so many styles and options, you can also create text that is not appropriate for the presentation, difficult to read, or simply does not look appealing.

Working with shapes and tables

Working with shapes involves inserting a shape, changing shape style, changing the shape fill, changing the shape outline and also changing the shape effect. You can resize and move the shape just like you do with text boxes and pictures.

The goal of most PowerPoint presentations is to communicate information to someone, or to a group of people. This information can be communicated in various ways such as pictures, lists, or paragraphs of text. Another way is to use a table to organize the information. A table is a grid of cells arranged in rows and columns.

Table Styles and Options.

When you insert a table, PowerPoint automatically applies a table style to the table. You can see the style option in the Table Styles group on the Design tab. PowerPoint applies a style based on the theme of your presentation.

Some of the most commonly used options include:

Header Row: This formats the first row of the table differently than other rows.

Banded Rows: This formats the table with banded rows (i.e., every other row will alternate colors).

WordArt Options: These commands do apply WordArt to text in the table.

Border Options: These commands do perform common tasks including changing the border line width and color.

Additional table formatting

This includes changing the sizes of the cells within the table and text alignment;

Align Text Left: Aligns text to the left of the cell

Center: Aligns text horizontally in the center of the cell

Align Text Right: Aligns text to the right of the cell

Align Top: Aligns text to the top of the cell

Center Vertically: Vertically centers text in the cell

Align Bottom: Aligns text to the bottom of the cell

Working with charts

A chart is a tool you can use to communicate your data graphically. Charts often help an audience to see the meaning behind numbers and make showing comparisons and trends easy. Charts are a visual representation of data which make it easy to see comparisons, patterns, and trends in the data. Formatting a chart will allow you to change the chart type, edit source data and change the chart style. The chart has several parts which are;

Source Data: The range of cells that make up a chart. The chart is updated automatically whenever the information in these cells change.

Title: The title of the chart.

Legend: The chart key, which identifies what each color on the chart represents.

Axis: The vertical and horizontal parts of a chart. The vertical axis is often referred to as the Y axis, and the horizontal axis is referred to as the X axis.

Data Labels: This command displays or hides data values next to each chart element.

Inserting movies

You can insert a movie into your PowerPoint presentation either from a file on your computer or from the Microsoft Office clip organizer. PowerPoint also gives you many options to define how the movie will operate in the presentation. One can work with movies by previewing the movie, by changing the movie volume and changing how the movie starts and stops. This is all done by using the options tab. Other options one can use are; Hide during Show, Play Full Screen, Loop until Stopped and Rewind Movie after Playing

Inserting sound

PowerPoint allows you to add sound to your presentation in several different ways. You can do this using a sound file on your computer, choose from hundreds of sounds available through the clip organizer, or play tracks from an audio CD. PowerPoint not only allows you to use sound, but also allows you to customize sound options so you can play the sounds you want, the way that you want. There are several options you can use to determine how the sound will be used in the presentation. These include:

Preview: Listen to the sound that will play.

Slide Show Volume: Change the volume to low, medium, high, or mute.

Hide During Show: Hide or display the sound icon during the slide show.

Loop Until Stopped: Sound will play until you stop it by clicking or advancing to the next slide.

The Picture Tools Format tab appears when a sound is inserted because the sound icon is a picture. You can format the sound icon just like any picture.

Cd audio tools options

Once you have inserted tracks from a CD, a CD Audio Tools Options tab appears. Many of the commands are similar to the commands available when you insert other sounds; however, some of the options are different which include in the Play and setup groups;

Preview: Listen to the sound that will play.

Slide Show Volume: Change the volume to low, medium, high, or mute.

Edit the Track and Time fields: change the tracks that play and the time in the track that playback starts or stops.

Change How to Play Track: Click the drop-down menu next to Play Track to change whether the CD tracks play automatically or when clicked.

Hide During Show: Hide or display the sound icon during the slide show.

Loop until Stopped: Sound will play until you stop it by clicking or advancing to the next slide.

Animating text and objects

Animations are the movements of the objects on the slide. You can animate text and objects such as clip art, shapes, and pictures on the slide. Animation, or movement, on the slide can be used to draw the audience's attention to specific content or to make the slide easier to read.

Other Custom Animation Effect:

Entrance animation effects: Changes how the selected item appears on the page

Emphasis animation effects: Draws attention to the selected item while the slide is displayed

Exit animation effects: Changes the way the selected item disappears from the slide Motion Path
animation effect: Animates the selected item so that it moves to a specific place on the screen.
Select an animation effect to apply it.

Working with animation effects

These effects vary based on the selected item. For example;

All at Once: The selected text appears all at once. The entire text is labeled with one number on the slide.

By 1st Level Paragraphs: The text will appear bullet by bullet, or paragraph by paragraph. Each level of text is labeled with a different number on the slide.

Using transitions

Transitions are visual movements as one slide changes to another in slide show view. Transition looping is when slides change over or switch in a ring form. A transition can be modified by applying a transition speed, applying the transition sound and removing a slide transition effect. You can also modify slides to display for a specific period of time before automatically advancing to the next slide. This is useful for unattended presentations, such as at a trade show booth.

Using the slide master

A slide master is a special slide that controls the properties of all other slides in a presentation. OR It is a top slide in a hierarchy of slides that stores information about the theme and slide layouts of a presentation including the background, color, fonts, effects, place holder sizes and positioning. Each time you apply a new theme to your slides, a slide master appears in the background. It stores information about the theme such as font style, colors, effects, placeholder size, text alignment, and more. The slide master allows you to easily make changes to all slides or a specific slide layout.

The easiest way to make the same change to all slides or slides that use a specific layout is to change the slide master, also called the master slide. For example, you may like a theme, but want to change a specific design element of the theme i.e. change a different bullet style, slide titles that are center-aligned instead of left-aligned, or an accent line under each slide title. You can quickly make these changes and more by modifying the slide master.

Slide master view

The slide master view appears similar to normal view; however, in slide master view master slides are displayed in the task pane rather than actual slides. The first thumbnail image in the task pane on the left is the slide master that controls all the slides. Each slide below the slide master is a master slide for a supporting layout. If you want to make a change to all the slides that use a Title and Content layout, you can do so using the Title and Content layout master slide in the task pane.

Making changes to specific layouts

In addition to changing design elements on all slides, you can change design elements on slides that use a specific layout. For example, you can apply different formatting to the Title and Content or Section Header layouts. By customizing specific slide layouts, you have more control over the slides and the presentation, as a whole.

SmartArt illustrations

Creating professional looking slides with illustrations seems challenging, but PowerPoint makes using illustrations very easy with the addition of SmartArt graphics. SmartArt graphics are a type of illustration that allows you to visually communicate information that you might otherwise include in the presentation as text.

Hyperlinks and action buttons

A hyperlink is a connection from one slide to a web page, email address, slide, or file. Text or objects such as pictures and shapes can be formatted as a hyperlink. In PowerPoint, you have the ability to link to a web page, email address, file, slide in the same presentation, and a slide in a different presentation. You can do all of this using two tools called hyperlinks and action buttons.

When you view the slide in slide show view, you will notice the pointer turns into a hand as it moves closer to the hyperlink. The hand pointer indicates that the text or object can be clicked. Since text automatically is formatted differently than other text on the slide, the hand pointer is most useful for hyperlinks that use an object such as a picture or shape.

In addition to hyperlinks, another tool you can use to connect to a web page, file, email address, and slide is called an action button, or action link. Action buttons are built-in button shapes that you can add to a presentation and use as a hyperlink. When someone clicks or moves over the button, the action can occur. Hyperlinks and action buttons are closely connected and can do many of the same things.

Arranging objects

In PowerPoint, you can align, group, rotate, and order objects such as pictures, shapes, and text boxes on the slide. Using PowerPoint commands, you can customize the slides and arrange the objects on the slides easily.

There are six basic alignment options on the Align menu. The menu options are: *Align Left, Align Center, Align Right, Align Top, Align Middle, and Align Bottom*.

The name of each menu option identifies how the option changes the alignment of the selected objects. However, each of these alignment options will vary based on whether Align to Slide or Align Selected Objects is selected from the menu. For example, if Align Selected Objects is active, and then you choose Align Top from the menu, the top of the selected objects will align. If Align to Slide is selected, and then you choose Align Top from the menu, all the selected objects will align to the top of the slide. Not every alignment option will work in all situations.

Group and rotate objects

Another command you can use to arrange objects is the Group command. At times you may want to group objects to make them easier to position on the slide. Instead of moving each object individually or using the align menu options to arrange the objects on the slide, you can group multiple objects into one object. Moving one object is often easier and faster than moving multiple objects on the slide.

Order objects

PowerPoint gives you the ability to arrange objects in a specific order. When you insert objects such as shapes and pictures onto a slide, each object is arranged based on the order it was inserted. E.g. if I insert Arrow A and then insert Arrow B, Arrow A will appear beneath Arrow B if I drag the objects so they are stacked on top of each other. This is because Arrow A was inserted before Arrow B. The same is true for other objects such as pictures and text boxes, or a combination of objects.

Indentation and line spacing

Indentation and line spacing are two important elements you can manage in your PowerPoint presentation that can change the way text on a slide appears. When used wisely, both can have a significant impact on the look of your slides. PowerPoint gives you the ability to create an indented, or subordinate, list within a list. If you are inserting content that is related to an existing bullet, an indented list can make the text and slide easier to read and more visually appealing to the audience.

In PowerPoint, you can adjust the space between a bullet in a list and the text. The ability to increase and decrease the indentation gives you control over the lists you use in a presentation, and allow you to customize them to meet your needs. One of the easiest ways to modify the indentation is by using the indent markers on the ruler.

If you are working with non-bulleted text, such as in a paragraph, you can still use the ruler markers to indent the text. Each marker works the same way, but moves slightly different parts of the text.

Line spacing

Line spacing is the spacing between sentences and paragraphs in a text box. You can modify the line spacing to fit more text onto a slide, or to add spacing to specific lines to draw attention to a part of the slide.

Finalize a presentation and package for cd

This will involve reviewing the slides for typographical errors, using the Proofing tools, or viewing the slides in slide show view a final time to see all the slides with animations and transitions in place. When finalizing, or completing a presentation, you may want to view the presentation in slide show view. This will allow you to see all the animations and transitions for each slide.

Changing slide show options

Show Type: The default setting is presenter, but if you plan to display the slides at a kiosk or booth, or if people will be looking at the slides independently in the PowerPoint window, you can change the setting in this section.

Show Slides: If you would like to skip one of the beginning or ending slides during the presentation, enter the slide numbers where you want to start and end the presentation in this section.

Show Options: With this you can choose to loop the slides continuously, or play the slides without any animation, if you added animation to the slides.

Advance Slides: If you added timing to each slide, in this section you can change the slide show so the slides have to be manually advanced.

DATA COMMUNICATION

&

NETWORKING

Chapter contents

Introduction

Direction of transmission

networks

Chapter questions

Communication means have been developed on top of the traditional manual and mechanical modes of communication for individuals and organizations to communicate more effectively. A person can now communicate through contemporary media like mobile phones and over the internet. It is therefore important that you are introduced to basic data communication and ICT networking infrastructure and services in order to come to terms with contemporary data communication facilities.

In this Chapter you shall be introduced to different modes of data transmission ,networking and the different kinds of networks that exist in the technological world.

Objectives

You should develop basic skills, knowledge and expertise in the use of contemporary communication facilities like computers, mobile telephones, Internet among others.

After completing this chapter, you will be able to do the following:

- Define a computer network and its purpose.
- Describe several uses for networks.
- Understand the various characteristics of a network, such as topology, architecture, and size.
- Understand characteristics about data and how it travels over a network.
- Name specific types of wired and wireless networking media and explain how they transmit data.
- Identify the most common communications protocols and networking standards used with networks today.
- List several types of networking hardware and explain the purpose of each.

Definition

Data communication:-

This is the process of transmitting data signal from one point to another through a network.

Components of data communication system

A Communication system has following components:

1. **Message:** It is the information or data to be communicated. It can consist of text, numbers, pictures, sound or video or any combination of these.
2. **Sender:** It is the device/computer that generates and sends that message.
3. **Receiver:** It is the device or computer that receives the message. The location of receiver computer is generally different from the sender computer. The distance between sender and receiver depends upon the types of network used in between.
4. **Medium:** It is the channel or physical path through which the message is carried from sender to the receiver. The medium can be wired like twisted pair wire, coaxial cable, fiber-optic cable or wireless like laser, radio waves, and microwaves.
5. **Protocol:** It is a set of rules that govern the communication between the devices. Both sender and receiver follow same protocols to communicate with each other.

UNE 2017 Qn 19 (a) (i) What is a data transmission media? (01 mark)

(ii) Give two examples of transmission media (02 marks)

(b) Name two services offered by data communication media

Characteristics of data transmission

All forms of data communications have several characteristics;

- Signal type- analog versus digital
- Transmission mode- asynchronous versus synchronous.
- Direction of flow- simplex, half duplex, full duplex.

Types of data signals

Data signal is an electromagnetic energy which represents the data flow. Data transmitted can be voice, text, video, sound, image or a combination of these (Multimedia).

Traditional telephone lines transmit analog signals. Computers transmit digital signals.

1. Analog signal:

When we speak, we transmit continuous sound waves, or analog signals. **An analog signal is a single continuously varying wave.** An analog signal has two characteristics; **frequency** which expresses the number of times the wave fluctuates and **amplitude** which means the size of voltage or magnitude of wave form.

2. Digital signal:

A digital signal consists of a series of on-off electrical pulses –bursts rather than waves. It can also refer to a discontinuous electrical signal, expressed as discrete burst in on/off electrical pulses.

Modulation -Demodulation

Data cannot be transmitted from one computer to another computer over a traditional telephone line as a digital signal. Rather, the sending computer's digital data must first be converted to

analog form. After the analog signal is sent through the phone line, the receiving computer must convert it back to digital form. This converting/reconverting is called modulation/demodulation.

Modulation. ***This is when a digital signal is converted into an analog signal so that data can be sent over phone lines.***

Demodulation. ***This is when an analog signal is converted back to digital form so that the transmitted data can be processed by the receiving computer.***

The device for translating digital signals into analog signals and back is called a modem.

One modem must be attached to the sending computer, another to the receiving computer.

Direction of transmission

Another characteristic of data transmission is direction. Data is sent in one direction, or it is sent in two directions in two types of ways.

There are three types of data transmission, namely;

1. Simplex transmission

In simplex transmission, data travels only in one direction. An example is a traditional radio or television broadcast. The viewer or listener cannot communicate back through the radio or television receiver back to the broadcaster, but it's only the station which communicates to the user.

Another example is data transmission used in museum rooms. Environmental devices send information about temperature and humidity to a computer, which adjusts environmental settings automatically. However, the computer does not send data back to these devices.

2. Half-duplex transmission

In half duplex transmission, data communication is two-way, but data travels in only one direction at a time.

A sender must first send the data before the recipient can reply. An example, if two police officers are communicating using a ‘walkie talkie’ radio, one has to say “over” to mark the end of every statement in order for other to respond.

3. **Full duplex transmission**

In full duplex transmission, data is transmitted in both directions simultaneously. An example of full duplex can be found in computers that are sending and receiving data on a network.

UNEBC 2015 Qn 20(a) Explain the following terms giving an example in each case.

(i) Simplex.

Example

(ii) Half duplex.

Example

Transmission modes: Asynchronous and synchronous

Asynchronous transmission

► Asynchronous transmission—data is sent when it is ready to be sent, without being synchronized. To identify the bits that belong in each byte, a start bit and stop bit are used at the beginning and end of the byte, respectively. This overhead makes asynchronous transmission less efficient than synchronous transmission and so it is not as widely used as synchronous transmission.

In asynchronous transmission data is sent one byte (or character) at a time. Each byte is preceded by a “start” bit and a “stop” bit.

In synchronous transmission, blocks or “packets” of several bytes at a time are transmitted without “start” or “stop” bits.

Synchronous transmission

Synchronous transmission—data is organized into groups or blocks of data, which are transferred at regular, specified intervals. Because the transmissions are synchronized, both devices know when data can be sent and when it should arrive.

Most data transmissions within a computer and over a network are synchronous transmissions.

Transmission speed: Bandwidth

The transmission speed of a channel is referred to as its bandwidth.

Bandwidth: -This is the maximum amount of data that a transmission medium (network cables) can carry at given period of time per second **OR** this is the measure of how much information/bits that can flow from one place to another per second.

Narrowband describes a channel in which the bandwidth of the message does not significantly exceed the channel's coherence bandwidth.

Coherence bandwidth is a statistical measurement of the range of frequencies over which the channel can be considered "flat", or in other words the approximate maximum bandwidth.

A **baud** is a data transmission speed of a bit per second over telephone line using a modem.

ISDN line

ISDN stands for **Integrated Services Digital Network**, which is hardware and software that allow voice, video and data Transmission digital signals over ordinary telephone copper wire.

It is five time faster than phone modem.

It also supports two phone lines so that you can talk on the phone on one line while connection on the internet on the other. Many telephone companies provide ISDN line which perhaps 2 or 3 times costly compared to a regular monthly phone service.

UNEBC 2015 Qn 18 Explain each of the following terms as used in information and communication Technology (05 marks)

- (a) Communication
- (b) Network
- (c) Protocol
- (d) Modem
- (e) Bandwidth

Advantages of ISDN over Modems include:-

- ✓ ISDN provides significant greater speed for data transmission; they are 5 times faster than a modem.
- ✓ ISDN allows multiple devices to a signal. A single ISDN line support two phone calls and two phone numbers and a third data link while a Modem support one phone line.
- ✓ ISDN provides crystal clear digital voice even if the other party is still on an analog line, you will hear a clear call which is not the case with a Modem
- ✓ ISDN is an affordable alternative to leased lines in terms of cost.
- ✓ ISDN provides a continuous connections while a Modem provides a periodic dial-up service

Broadband is used to refer to data transmission using ADSL (**Asymmetric Digital Subscriber Line**)

ADSL is a means of transmitting digital signals using telephone lines and can be faster than narrowband. Coaxial cables, fibre optic cables, microwaves and satellites are commonly used to provide broadband. ADSL is considered to be the successor to ISDN

Base band signal: - is a digital signal that is generated and applied to the transmission medium directly without modulation.

Attenuation: - This is the decrease in magnitude and energy as a signal progressively moves along a transmission medium. **Or** refer to as signal loss in strength as it is transmitted along the media. If the signal is not boosted (amplified), it will be lost along the way and may never reach the destination. Attenuation or signal loss is corrected by placing a signal amplifier called a **Repeater**.

Packet is a maximum-fixed length block of data for transmission. A packet also contains instructions about its destination.

Packet switching: - Packet Switching is a technique for dividing electronic messages into packets for transmission over a wide area network to their destination through the most expedient routes.

The benefits of packet switching are;

- ★ It can handle high volume, traffic in a network. It is used in large networks such Tele net.
- ★ It also allows more users to share a network.
- ★ Messages are sent over a long distance

UNEБ 2013 Qn 9. Outline five factors which determine data transmission speeds over the internet. (05 marks)

- ✓ *The distance the data travels.*
- ✓ *The media in which the data travels*
- ✓ *The equipment used by the service provider*
- ✓ *The processing speed of the server*
- ✓ *The traffic which comes across the server*

NETWORKS

Information gains value if it can be shared through a computer network. A network is a collection of data communications hardware, computers, communications software, and communications channels connected so that users can share them.

UNEБ 2014 Qn 8(a) List any three threats to data in a computer networked environment.
b) Name any two types of security measures which can be used to control the threats listed in (a) above.

*Telecommuting.
Is the use of
computers &
networking
technologies to
enable an
individual to
work from a
remote location*

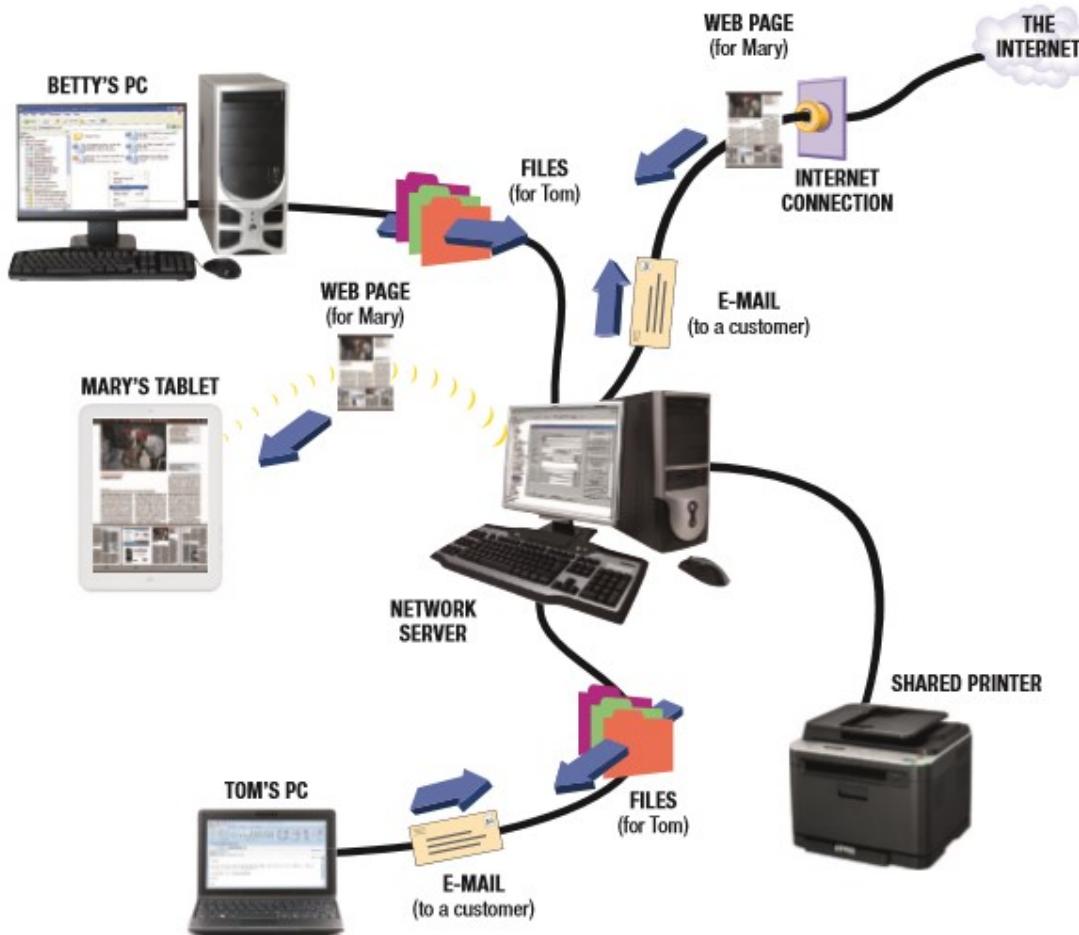
Computer network

A computer network is a collection of computers and other devices that are connected together to enable users to share hardware, software, and data, as well as to communicate electronically with each other. Computer networks exist in many sizes and types. For instance, home networks are commonly used to allow home computers to share a single printer and Internet connection, as well as to exchange files. Small office networks enable workers to access company records stored on a network server, communicate with other employees, share a high-speed printer, and access the Internet.

School networks allow students and teachers to access the Internet and school resources, and large corporate networks often connect all of the offices or retail stores in the corporation, creating a network that spans several cities or states. Public wireless networks—such as those available at some coffeehouses, restaurants, public libraries, and parks—provide Internet access to individuals via their portable computers and mobile devices; mobile telephone networks provide Internet access and communications capabilities to smartphone users. Most computers today connect to a computer network.

UNEBC 2017 Qn11.(a) Outline any three threats that a system administrator may face as a result of networking computers (03 marks)

(b) Suggest any two measures that the system administrator can employ to reduce the network threats (02 marks)



UNEBC 2014 Qn 7(a) Identify any three devices other than computers required to set up a network within a school environment.

b) Distinguish between data communication and networking.

Private Network

A private network is a network supporting the voice and data communications needs of a particular organization. Usually this is a business organization.

Business organization with geographically separated facilities and a need to transmit large volumes of data or voice messages install their own private networks. The southern pacific

railroad, for example, was one of the first such organizations. Towers in its microwave communications network can be seen along its major rail lines.

Public Network

A public network is a network providing subscribers with voice and data communications over a large geographical area. In such cases, subscribers pay a fee to use the network. Examples of public networks are AT & T, sprint, and MCI, which are called common carriers.

Some public networks offer teleconferencing and multimedia conferencing services:

Teleconferencing: *This is the electronic linking of several people who participate in a conversation and share displayed data at the same time.*

Multimedia conferencing: *multimedia conferences allow users not only to see and hear one another but to work on text and graphics projects at the same time.*

The term Transmission media refers to the physical or non-physical link between two or more computers in which a signal can be made to flow from source to destination.

NETWORK CHARACTERISTICS

Networks can be identified by a variety of characteristics, including whether they are designed for wired or wireless access, their topology, their architecture, and their size or coverage area. These topics are described in the next few sections.

- UNEB Qn 16 (a) Give two wireless transmission media (02 marks)
(b) Identify three limitations of wireless transmission media (03 marks)

Wired vs. Wireless Networks

Networks can be designed for access via wired and/or wireless connections. With a wired network connection, the computers and other devices on the network are physically connected (via cabling) to the network. With a wireless network connection, wireless (usually radio) signals are used to send data through the air between devices, instead of using physical cables. Wired networks

include conventional telephone networks, cable TV networks, and the wired networks commonly found in schools, businesses, and government facilities. Wireless networks include conventional television and radionetworks, cellular telephone networks, satellite TV networks, and the wireless networks commonly found in homes, schools, and businesses. Wireless networks are also found in many public locations (such as coffeehouses, businesses, airports, hotels, and libraries) to provide Internet access to users while they are on the go via public wireless hotspots. For a look at how wireless networks are being used at baseball and football stadiums today, see the Trend box. Many networks today are accessible via both wired and wireless connections. For instance, a business may have a wired main company network to which the computers in employee offices are always connected, as well as provide wireless access to the network for visitors and employees to use while in waiting rooms, conference rooms, and other locations within the office building. A home network may have a wired connection between the devices needed to connect the home to the Internet (such as a modem and router), plus wireless access for the devices in the home (such as computers, printers, televisions, and gaming devices) that will access the home network wirelessly. Wired networks tend to be faster and more secure than wireless networks, but wireless networks have the advantage of allowing easy connections in locations where physical wiring is impractical or inconvenient (such as inside an existing home or outdoors), as well as giving users much more freedom regarding where they can use their computers. With wireless networking, for example, you can surf the Web on your notebook computer from anywhere in your house, access the Internet with your media tablet or smartphone while you are on the go, and create a home network without having to run wires among the rooms in your house.

Network Topologies

The physical topology of a computer network indicates how the devices in the network are arranged. Three of the most common physical topologies are star, bus, and mesh.

- Star network—used in traditional mainframe environments, as well as in small office, home, and wireless networks. All the networked devices connect to a central device (such as a server or a

switch, discussed later in this chapter) through which all network transmissions are sent. If the central device fails, then the network cannot function.

- Bus network—uses a central cable to which all network devices connect. All data is transmitted down the bus line from one device to another so, if the bus line fails, then the network cannot function.
- Mesh network—uses a number of different connections between network devices so that data can take any of several possible paths from source to destination. With a full mesh topology, each device on the network is connected to every other device on the network. With a partial mesh topology, some devices are connected to all other devices, but some are connected only to those devices with which they exchange the most data. Consequently, if one device on a mesh network fails, the network can still function, assuming there is an alternate path available. Mesh networks are used most often with wireless networks.

Network Architectures

Networks also vary by their *architecture*; that is, the way they are designed to communicate. The two most common network architectures are *client-server* and *peer-to-peer (P2P)*.

Client-Server Networks

Client-server networks include both *clients* (computers and other devices on the network that request and utilize network resources) and *servers* (computers that are dedicated to processing client requests). Network servers are typically powerful computers with lots of memory and a very large hard drive. They provide access to software, files, and other resources that are being shared via the network. Servers typically perform a variety of tasks. For example, a single server can act as a *network server* to manage network traffic, a *file server* to manage shared files, a *print server* to handle printing-related activities, and/or a *mail server* or *Web server* to manage e-mail and Web page requests, respectively.

For instance, there is only one server in the network illustrated in and it is capable of performing all server tasks for that network. When a client retrieves files from a server, it is called *downloading*; transferring data from a client to a server is called *uploading*.

Peer-to-Peer (P2P) Networks

With a *peer-to-peer (P2P) network*, a central server is not used. Instead, all the computers on the network work at the same functional level, and users have direct access to the computers and other devices attached to the network. For instance, users can access files stored on a peer computer's hard drive and print using a peer computer's printer, provided those devices have been designated as *shared devices*. Peer-to-peer networks are less expensive and less complicated to implement than client-server networks because there are no dedicated servers, but they may not have the same performance as client-server

Network Size and Coverage Area

One additional way networks are classified is by the size of their coverage area. This also impacts the types of users the network is designed to service. The most common categories of networks are discussed next; these networks can use both wired and wireless connections.

Personal Area Networks(PANs)

A **personal area network (PAN)** is a small network of two or more personal devices for one individual (such as a computer, mobile phone, headset, media tablet, portable speakers, smart watch, fitness gadget, and printer) that is designed to enable those devices to communicate and share data. PANs can be set up on demand or set up to work together automatically as soon as the devices get within a certain physical distance of each other. For instance, a PAN can be used to synchronize a mobile device automatically with a personal computer whenever the devices are in range of each other, to connect a media tablet to a portable speaker, or to connect a mobile phone to a headset and/or smart watch . *Wireless PANs (WPANs)* are more common today than wired PANs and are typically implemented via *Bluetooth* or another short-range networking standard (discussed shortly) or via the Internet using Google or another cloud service.

Local Area Networks (LANs)

A **local area network (LAN)** is a network that covers a relatively small geographical area, such as a home, an office building, or a school. LANs allow users on the network to exchange files and e-

mail, share printers and other hardware, and access the Internet. The client-server network shown in is an example of a LAN.

Metropolitan Area Networks (MANs)

A **metropolitan area network (MAN)** is a network designed to service a metropolitan area, typically a city or county. Most MANs are owned and operated by a city or by a network provider in order to provide individuals in that location access to the MAN.

Some wireless MANs (often referred to as *municipal Wi-Fi* projects) are created by cities (such as Riverside, California—or large organizations (such as Google in Mountain View, California) to provide free or low-cost Internet access to area residents. In addition, some Internet service providers (such as Comcast) are experimenting with setting up free wireless MANs in select metropolitan areas for their subscribers to use for Internet access when they are on the go.

Wide Area Networks (WANs)

A **wide area network (WAN)** is a network that covers a large geographical area. Typically, a WAN consists of two or more LANs that are connected together using communications technology. The Internet, by this definition, is the world's largest WAN. WANs may be publicly accessible, like the Internet, or they may be privately owned and operated. For instance, a company may have a private WAN to transfer data from one location to another, such as from each retail store to the corporate headquarters. Large WANs, like the Internet, typically use a mesh topology.

Intranets and Extranets

An **intranet** is a private network (such as a company LAN) that is designed to be used by an organization's employees and is set up like the Internet (with data posted on Web pages that are accessed with a Web browser). Consequently, little or no employee training is required to use an intranet, and intranet content can be accessed using a variety of devices. Intranets today are used for many purposes, including coordinating internal e-mail and communications, making company publications (such as contact information, manuals, forms, job announcements, and so forth) available to employees, facilitating collaborative computing, and providing access to shared calendars and schedules. A company network that is accessible to authorized outsiders is called an **extranet**.

Extranets are usually accessed via the Internet, and they can be used to provide customers and business partners with access to the data they need. Access to intranets and extranets is typically restricted to employees and other authorized users, similar to other company networks.

UNEBC 2015 Qn 17. (a) Differentiate between a server and a client computer. (02 marks)

(b) What is the function of each of the following network devices? (03 marks)

- i. Bridge
- ii. Switch
- iii. Router

Advantages of networking

The advantages of setting up computer networks include:

Resource sharing

A resource in the network environment means any component that can be attached to the network for access by users. This includes

- Hardware sharing: sharing of expensive peripheral devices such as laser printers, scanner, and fax machine among many users of company.
- Program and data sharing: in most organizations, people use the same software and need access to the same information, which could be expensive to have a copy of software for each employee.
- Access of same data on a shared storage device hence updates are easily made accurately,
- Network links all employees using *groupware* hence work together online on shared project.

Better communication

- Remote communication refers to transmission of data signals between two communication devices at different geographical locations, through remote communication people can share ideas and give freedom to network users who can work from home just as if they were in their offices (Telecommuting)

- One of the greatest features of networks is *electronic mails* which cheap, fast and convenient means of communication.

Distributed processing facilities

Distributed processing refers to run the same program or databases on different networked computers. This mode of data processing has advantages on the network

- o In case of failure of one of the computer, does not affect the operation of the other terminals
- o Processing load is shared equally hence no time wastage.

Cost effectiveness

Networks are cost effective in organization. Although the initial purchase and laying down of components may be expensive.

Access to databases

Networks also enable users to tap into many databases whether private or public databases of on line services, hence making research simple.

Security of information

Today data baked up on a networked storage device shared by users to avoid data loss.

Computer network is **reliable** because data is transferred with minimum error from source to destination

- UNEBC 2015 Qn 16. (a) Define the term Computer Network.(02 marks)
b) Give three disadvantages of networking computers (03 marks)

Limitation (demerits) of networking

Moral and cultural effect

- The internet has chat-rooms and messaging services that may enable teenagers to meet peers and adults on the net whom may have bad intentions.

- Access to pornographic and other bad material has made the fight against social problems, bad sexual behavior and drug abuse more complicated.

Over reliance on the network

- Some organization over-reliance on the network and in case of the server breaks down the entire organization activities are brought to a halt.

High initial cost

- The initial cost of buying network hardware and software and installing the network is high.

Risks and threat

- is an increased risk of data corruption. Since many users will be using the system, there is a greater chance of data being corrupted (damaged)
- There is greater risk from viruses. Because they are easily spread between computers are part of a network.
- Organization finds it very challenging to guard information system from constant threats of illegal access.

Components that required for networking

A computer network is made up of several standard components which are classified into three categories namely:

- ★ Data communication media
- ★ Communication devices
- ★ Networking software
- ★ Work station or computers.

Data communications media

A data communication medium is a pathway used to for carrying data/information from one point to another, which is from source to destination. Various devices on the network are linked together by means of communications media (channels / paths).

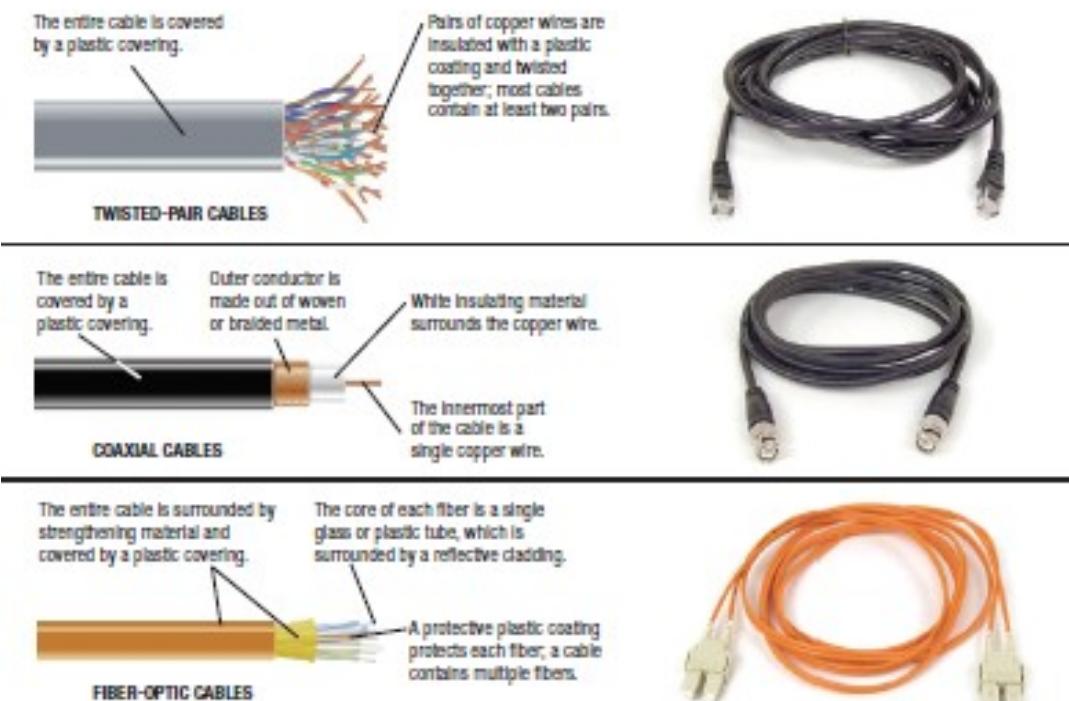
Data communication media can be divided into two namely:-

1. Wired communication
2. Wireless Communication.

Wired Communication

This is a data communication media where data signals are transmitted through physical pathway.

There are several types



of network cables but the most common ones are:-

Twisted pair cables

Coaxial cable

Fibre Optic Cables

Twisted pair cable

This consists of two insulated copper wires twisted in a spiral pattern to minimize electromagnetic fields around the two wires as transmit data also called **crosstalk**. It is the cheapest, most common media for both analog and digital signals. These cables are mostly used to data signals form transmission.

There are two types of twisted pair cables are:

- a) Unshielded Twisted Pair (UTP)
- b) Shielded Twisted Pair (STP)

The difference between the UTP and STP is that STP has a brand shield which is wrapped around the wires to protect them from electromagnetic interferences called 'Electric Noise'.

Advantages of twisted pair cable

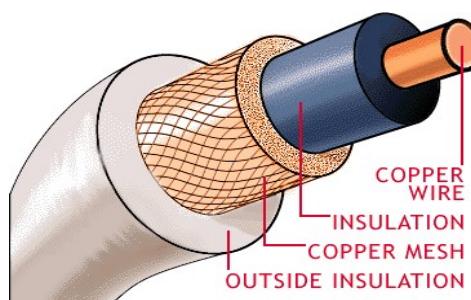
- ✓ Installation equipment is cheap and readily available. and
- ✓ It is cheap and available because of mass production for telephone use.
- ✓ It is easier and convenient to install.

Disadvantages of Twisted Pair Cable

- ★ It suffers high attenuation
- ★ It is sensitive to electromagnetic interference eavesdropping.
- ★ It has low speed on data transmission compared to other cables.

Coaxial Cable

Coaxial cable has a central inner copper core and an outer sheath of copper mesh that are insulated from each other. It resembles a cable which connects a TV to an antenna. Coaxial cable is more expensive than twisted pair and is used to transmit voice, video and data.



Advantages of coaxial cable

- It is very stable even when under high loads.
- It has a large bandwidth (up to 1Gbps) compared twisted pair.
- It is more resistant to radio and electromagnetic interference than the twisted pair cable.
- It can carry voice, data and video signal simultaneously.

Disadvantages of coaxial cable

- ✓ Thick coaxial cable is hard to work with.
- ✓ It is relatively expensive to buy and to install as compared to twisted pair.

Fibre Optic Cable

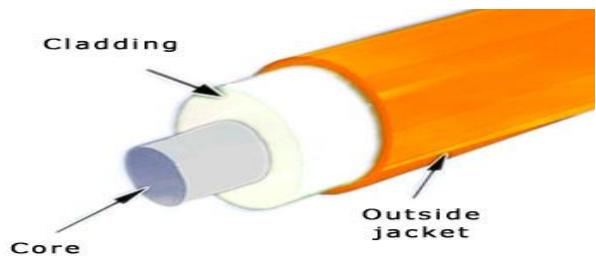
Fiber-optic cable is the newest and fastest of these three types of wired transmission media. It contains multiple (sometimes several hundred) clear glass or plastic fiber strands, each about the thickness of a human hair. Fiber-optic cable transfers data represented by light pulses at speeds of billions of bits per second. Each strand has the capacity to carry data for several television stations or thousands of voice conversations, but each strand can only send data in one direction so two strands are needed for full-duplex data transmissions.

Fiber-optic cable is commonly used for the high-speed backbone lines of a network, such as to connect networks housed in separate buildings or for the Internet infrastructure.

It is also used for telephone backbone lines and, increasingly, is being installed by telephone companies all the way to the home or business to provide super-fast connections.

The fibre optic cable is made up of thin strands of glass that transmit data signal in a form a beam of light. The fibre optic cable is made of core, cladding and the outside jacket

Core: This is the central part of the cable and it is made up of hollow transport glass or plastic.



Cladding: - This is a protective surrounding of the core. It is a cut covering layer of the core.

Jacket: it is outer covering of the cable.

Advantages of Fibre Optic Cable

- ❖ It is immune to electromagnetic interference and eavesdropping.
- ❖ It is fast and supports high bandwidth.
- ❖ It can be used for long distances because it suffers low attenuation.
- ❖ It can be used in hazardous places (highly flammable) because it doesn't generate electrical signal.
- ❖ It smaller and lighter than copper cable.

Disadvantages of Fibre Optics Cables

- Connectivity devices and the media are expensive.
- Installation is difficult because the cable must be carefully handled.
- It is relatively complex to configure.
- A broken cable is difficult and expensive to repair.

Wireless communication

This is type of communication medium that is used to transport data signals from one point to another without physical connections.

Examples of Wireless Connections

- Micro wave systems...
- Satellite transmission.
- Antenna.
- Radio communication
- Infrared transmitter
- Bluetooth

Advantages of a Wireless connection

- ❖ Wireless medium is flexible in operation as compared to cable that is devices can be moved around without losing access to the network.
- ❖ Wireless networks can span a large geographical area.
- ❖ Wireless communication can take place via satellite even in a very remote area connection is possible.

Disadvantages of a Wireless connection

- ★ Initial cost of setting up wireless communication is very high.
- ★ It is relatively difficult to establish or configure.

Networking hardware

These are devices used as interfaces or junctions between terminal devices. **Terminal equipments** are devices at both ends of the communication link such as a computer.

UNEBS 2017 Qn 17 Give five examples of networking hardware (05 marks)

Network Interface Card (NIC)

Network Adaptor or NIC is a circuit board that creates a physical link between the computers through transmission media. A network interface card is plugged into an empty expansion slot on the motherboard. However, most of the computers today come with onboard network interface controller.



Hubs



A hub is a hardware that connects a large number of computers and broadcasts received data to all the computers or other devices attached on the same network. That is, a hub consists of multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets.

Bridges

Bridges connect one LAN to another. A bridge can forward data from one LAN to another, and can filter out data not intended for the destination LAN.

The purpose of using a bridge therefore is to:



- Extend the length and number of stations
- Reduce overall traffic flow by allowing broadcasts only in destination LAN.

Switches

A network switch can perform similar functions to hubs and bridges. Unlike hub, a switch forwards a packet directly to the address of network device it is intended for without broadcasting.



Or. A device used to connect multiple devices on a single (typically wired) network; forwards packets to only the intended recipients.

Repeaters

A repeater receives signal from one segment of network, cleans it to remove any distortion, boosts or amplifies it to another segment of LAN.

The repeater enables the network to eliminate attenuation problems.

Router

The router interconnects different networks and directs the transfer of data packets from source to destination. Each network has a unique identifier or address called the network address or IP address.



Or. A router forwards packets to their next location in order to efficiently reach their destination.

Gateways

A gateway is any device that can be configured to provide access to wide Area Network (WAN) or internet. One of the devices is router. However a gateway may not be necessarily a router, it may be a computer configured to provide access to the internet.

Connector: The RJ45 are attached to the terminals of the twisted pair cables.



RJ 45 Connector



Circular Connector

NETWORK SOFTWARE

It is communication software that manages the transmission of data between computers and other devices attached on the network. Network software can be classified in two main groups namely: -

1. Network Operating system (NOS).
2. Network Protocol

Network Operating System (NOS)

These are operating systems designed to manage the network, computers ability to respond to services request. Examples include Windows NT, XP, Vista, Window Server 2003, Novel Netware, Unix, and Linux.

Functions of NOS

- It provides access to network resource e.g. printer and all folders.
- It enables nodes on the network to communicate with each other more efficiently.
- It supports inter-process communication i.e. enables the various processes of the network to communicate with one another.
- It responds to request from application programs running on the network.
- It supports network services like network card drivers and protocols
- It used to implement security features.

- It monitors the operation of the network. It is possible for the network administrator to tell who is using what and when.
- It records and fixes errors in the networks communication.

Network protocols

Protocols are set of rules and procedures that govern communication between two different devices or computers on the network.

For instance, protocol in your communication software, for example, will specify how receiving devices will acknowledge sending devices, a matter called hand shaking.

Protocols will also specify the type of electrical connections used the timing of message exchange, error-detection techniques, and so on.

Examples of protocols include:

- ★ Simple mail transfer protocol (**SMTP**)- An internet protocol for transferring e-mail
- ★ File transfer protocol (**FTP**) - an internet protocol for file transfer.
- ★ Transmission control protocol (**TCP**)-This is responsible for delivery of sequenced data over the network.
- ★ **NetBEUI**- A local area network protocol that establishes communication sessions between computers. It is for Microsoft or IBM networks only.
- ★ Internet protocol (**IP**) and Netware protocols are for packet forwarding and routing.
- ★ Sequential Packet exchange (**SPX**), is a part of Novel internet work packet exchange for sequenced data.

A server

A server is a powerful computer that runs the network operating system and allows resources shared over the network.

OR

Servers are dedicated computers on a network that perform one or more functions on behalf of the other computers.

Work station

A workstation is simply a personal computer connected to a LAN. The basic difference between a **standalone** computer and a **workstation** is that the latter has communications capabilities added to enable it to exchange information with other computers and devices on network (nodes).

Note:

Bluetooth: A networking standard for very short-range wireless connections, the devices are automatically connected once they get within the allowable range.

WI-FI: A widely used networking standard for medium-range wireless network. (Wireless Fidelity)

Chapter questions

1(a) what is meant by data communication? (1 mark)

(b) Briefly explain any four elements of data communication (04 marks)

2(a) Distinguish between physical and wireless transmission media (02 marks)

(b) Give any three factors to consider when choosing a communication /transmission media (03 marks)

3 (a) Explain the term network protocol (02 marks)

(b) Name any three networking protocols (03 marks)

4(a) Distinguish between digital from analog data (02 marks)

(b) Why is binary system mostly used during data transmission (03 marks)

5 (a) Explain the following terms as used in data communication (05 marks)

- i. Bandwidth
- ii. Network topology
- iii. Duplex
- iv. Simplex

v. Half duplex

6 (a) what is meant by the term wireless technology (01 mark)

(b) Mention any four wireless technology used in data transmission (04 marks)

7 (a) Distinguish between Baseband and broadband transmission of signals in data communication (02 marks)

(b) Give three advantages of optical fibre in data transmission (03 marks)

8 Explain the following data transmission techniques (05 marks)

- (i) Bluetooth
- (ii) Satellite
- (iii) Wi-fi
- (iv) Infrared
- (v) Microwaves

9 Mention one application of the following data transmission techniques (05 marks)

- (a) Twisted pair cables
- (b) Satellite
- (c) Bluetooth
- (d) Wi-fi
- (e) Microwaves

10 State five factors an IT professional considers before setting a computer network for an organization (05 marks)

11 (a) Distinguish between physical and wireless transmission technology (02 marks)

(b) Give any three advantages of using wireless technology compared to other traditional technologies (03 marks)

12 (a) what are data communication tools? (01 mark)

(b) Briefly explain the following services offered by data communication tools (04 marks)

- (i) Email
- (ii) Skype
- (iii) Instant messaging (IM)
- (iv) News groups

CHAPTER 11: DESKTOP PUBLISHING SOFTWARE (DTP)

Desktop publishing (abbreviated DTP) is the creation of documents using page layout skills on a personal computer. Desktop publishing software can generate layouts and produce typographic quality text and images comparable to traditional design and printing. This technology allows individuals, businesses, and other organizations to self-publish a wide range of printed matter. Desktop publishing is also the main reference for digital design. When used skillfully, desktop publishing allows the user to produce a wide variety of materials, from menus to magazines and books, without the expense of commercial printing.

Desktop publishing combines a personal computer and WYSIWYG page layout software to create publication documents on a computer for either large scale publishing or small scale local multifunction peripheral output and distribution. Desktop publishing methods provide more control over design, layout, and design than word processing. However, word processing software has evolved to include some, though by no means all, capabilities previously available only with professional printing or desktop publishing.

The same DTP skills and software used for common paper and book publishing are sometimes used to create graphics for point of sale displays, promotional items, trade show exhibits, retail package designs and outdoor signs. Although what is classified as "DTP software" is usually

limited to print and PDF publications, DTP skills aren't limited to print. The content produced by desktop publishers may also be exported and used for electronic media. The job descriptions that include "DTP", such as DTP artist, often require skills using software for producing e-books, web content, and web pages, which may involve web design or user interface design for any graphical user interface.

Definition

It is software used to design and produce complicated documents that contain text, graphics and brilliant colors.

DTP software is ideal for the production of high-quality color documents such as;

- ❖ Newsletters.
- ❖ Invoices.
- ❖ Flyers.
- ❖ Brochures.
- ❖ Menus.
- ❖ Receipts.
- ❖ Business cards.
- ❖ Greeting cards.
- ❖ Certificates.
- ❖ Catalogues.
- ❖ Textbooks.
- ❖ Banners.
- ❖ Annual reports.

It normally requires a powerful microcomputer, graphics display, mouse, laser printer.

Examples of electronic publishing software

- ❖ Microsoft Publisher
- ❖ Adobe PageMaker
- ❖ Adobe InDesign
- ❖ QuarkXPress
- ❖ Broderbund Print Shop Pro.
- ❖ Adobe illustrator.

Advantages of DTP over word processors

- ❖ DTP software is specifically designed to support page layout, which is the process of arranging text and graphics in a document on a page-by-page basis.
- ❖ DTP software includes color libraries to ensure that colors will print exactly as specified.
- ❖ DTP software supports colors separation for producing the master copies used in the final presswork.

UNEBC 2017 Qn 10 (a) Name any two examples of documents created using desktop publishing application

(b) State any three desktop publishing features that can enhance the documents you named in 10(a) (02 marks)

Characteristics of dtp

- They have color libraries.
- They have drawing and picture editing tools.
- They allow for color separation.
- They do high quality graphics work.

Electronic publication

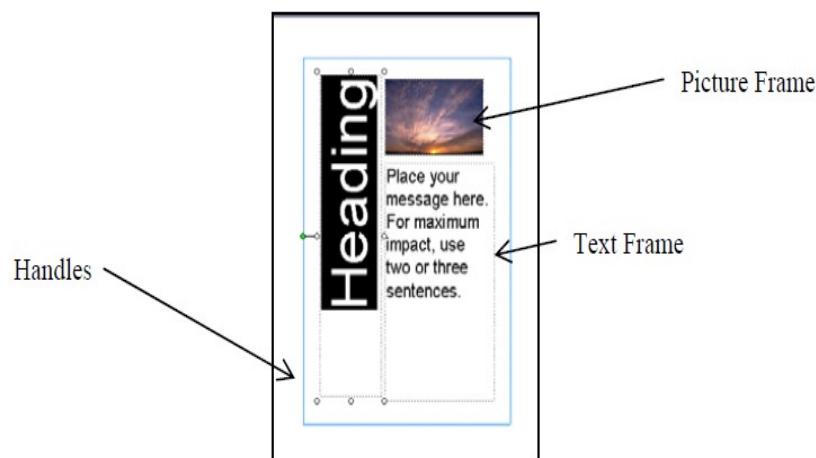
Electronic Publishing is the use of electronic publishing software to create sophisticated documents that contain text graphics and many colors.

Uses of electronic publication software

- ★ It is ideal for the production of high quality color documents such as text books, corporate newsletters, marketing literature (adverts), product catalogues, business cards, gift certificates, flyers, brochures and annual reports, etc.
- ★ It is used in creating of web pages.
- ★ It is also used to share the above documents over the internet.

Some Useful Definitions:

- ★ **Frame** – Most publications are divided into several different areas called frames. A frame can contain a variety of objects such as graphics, tables, or text boxes. Frames can be resized, moved and manipulated to suit your needs.
- ★ **Handles** – When you click on a frame, small circles appear around the edge of the frame. These are called handles. You can click and drag on the handles to resize your frame.
- ★ **Template** -A Template is a tool used in Publisher to help you easily create basic publications. The template has a set of pre-chosen design styles that you can use as it is or customize as you see fit.

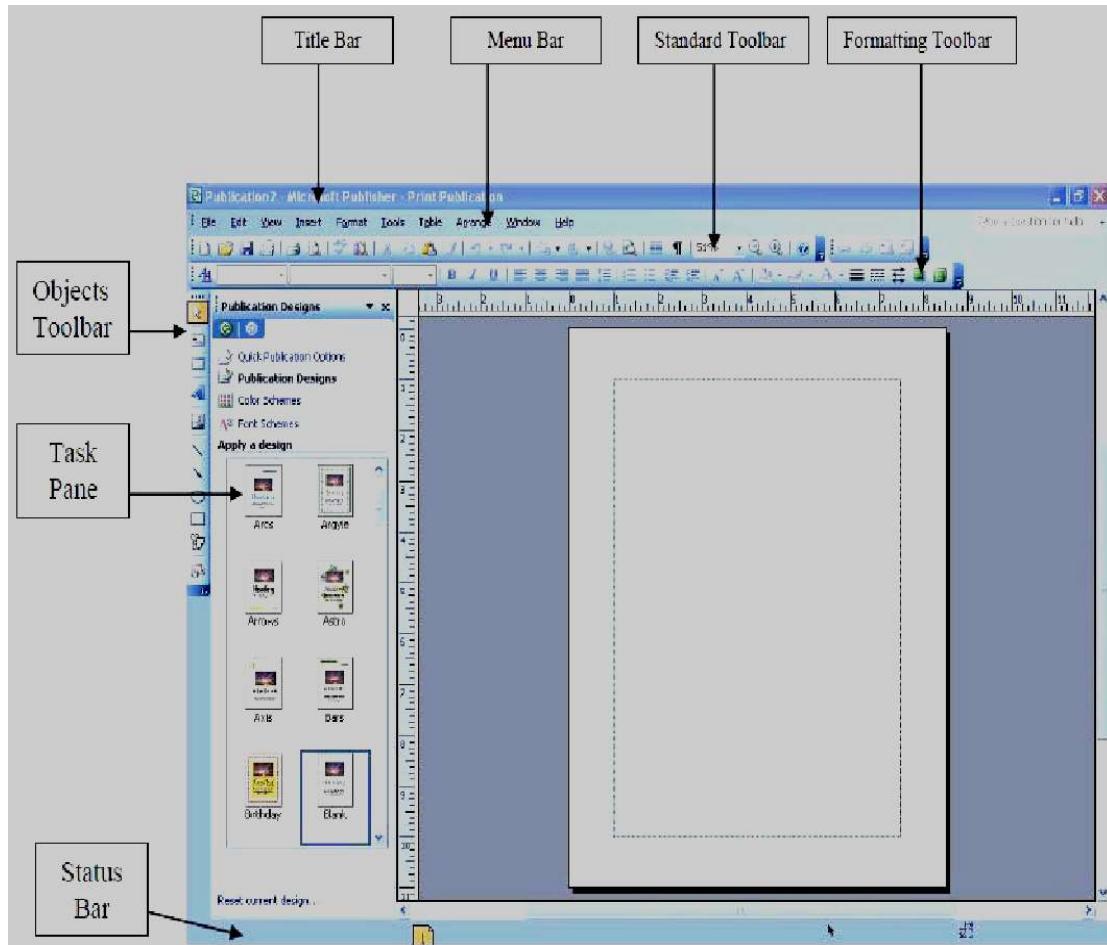


Starting Microsoft Office Publisher

From the Start menu, select **All Programs » Microsoft Office » Microsoft Office Publisher**

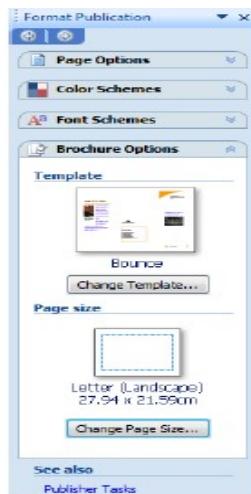
Publisher opens and the New Publication task pane appears, offering many pre-formatted designs to use in creating your publication.

Parts of Microsoft Office Publisher document



- ❖ **Title Bar:** The Title Bar displays the document's name, and contains the Close, Restore and Minimize buttons.
- ❖ **Menu Bar;** The Menu Bar contains menus with additional commands in the form of a drop-down list.
- ❖ **Standard Toolbar:** The Standard Toolbar contains frequently used buttons that are common functions in Publisher and throughout Microsoft Office. This toolbar is similar in most Office 2003 programs.
- ❖ **Formatting Toolbar:** The Formatting Toolbar contains buttons for common text formatting options in Publisher and throughout Microsoft Office. This toolbar is similar in most Office 2003 programs.

- ❖ **Task Pane:** The task pane provides quick access for complicated functions and can include



Help, Clip Art, Find and Replace, Graphics Manager, Publication Designs, Styles and Formatting, and many others.

- ❖ **Status Bar:** The Status Bar shows the size and position of the object on the Work.



- ❖ **Object Bar:** The Object Bar contains each of the tools you will use to create and manipulate text and graphics in Publisher.

	Tool	Function
	Select Objects	Selects lines, shapes, graphics, and text boxes. Selected items can be resized and have their attributes changed.
	Text Box	Creates text boxes.
	Insert Table	Creates tables.
	Insert WordArt	Adds <i>WordArt</i> to your publication.
	Picture Frame	Creates a frame in which a picture may be inserted.
	Line Tool	Creates a line.
	Arrow Tool	Creates an arrow.
	Oval Tool	Creates circular and oval shapes.
	Rectangle Tool	Creates rectangular shapes.
	AutoShapes	Creates a variety of different shapes EXAMPLE: Hearts, lightning bolts, thought boxes
	Design Gallery Object	Inserts a wide array of different objects from the <i>Microsoft Publisher Design Gallery</i>

CHAPTER 12:

DATABASE MANAGEMENT SYSTEMS

A **database** is an organized collection of data. It is the collection of schemas, tables, queries, reports, views and other objects. The data are typically organized to model aspects of reality in a way that supports processes requiring information, such as modeling the availability of rooms in hotels in a way that supports finding a hotel with vacancies.

A **database management system (DBMS)** is a computer software application that interacts with the user, other applications, and the database itself to capture and analyze data. A general-purpose DBMS is designed to allow the definition, creation, querying, update, and administration of databases. Well-known DBMSs include MySQL, PostgreSQL, Microsoft SQL Server, Oracle, Sybase, SAP HANA, and IBM DB2. A database is not generally portable across different DBMSs, but different DBMS can interoperate by using standards such as SQL and ODBC or JDBC to allow a single application to work with more than one DBMS.

Database management systems are often classified according to the database model that they support; the most popular database systems since the 1980s have all supported the relational model as represented by the SQL language.

Definition.

- DBMS is the software which allows a user to create access and manage a database.

What is a database?

1. Is a collection of related information stored in a structured format.
2. Is a collection of logically related data that can be organized and accessed quickly.

Examples of databases

- Telephone books (directories)
- Customer address books
- Employee information forms
- Dictionaries
- Television guides e.t.c.

Examples of database management system applications

(Database software)

1. Advantage Database Server
2. Bento
3. Borland Database Engine
4. Dbase I, II, III, IV, V
5. FileMaker
6. File Pro
7. Microsoft Visual FoxPro
8. Microsoft Access
9. Oracle Database
10. Corel Paradox

11. Lotus Approach

12. SQL (Structured Query Language)

13. Claris File Maker pro e.t.c.

Characteristics of databases

- The data is arranged in columns (fields) and rows (columns)
- Each column has similar data items.
- Each row contains information belonging to a single individual.

Advantages of using electronic database system

- It is easy to enter and retrieve data in a short period of time.
- A database stores data that is consistent and reliable since at each stage, it is checked for consistency and reliability.
- A database can store data for a very long period of time say 20 years and so in an archive.
- A database is flexible since it can be redesigned, to hold thousands of data.
- A database can be used by many people at the same time.
- Data is frequently updated after each single entry.
- Data is automatically saved as soon as data is entered into a database.
- Data can be retrieved in different formats e.g. Query, forms, reports, etc.

Disadvantages of database system

★ Complexity

They include sophisticated software packages that may require special hardware

They are also difficult and time consuming to develop

★ Initial expense

Because of their complexity and efficiency, database systems can be expensive to set up.

★ Vulnerability

Data in a database may be more susceptible to sabotage, theft or destruction

★ Need for substantial conversion effort

Changing from a traditional file oriented system to a database system can often involve large scale reorganization of data and programs. This normally creates user resistance.

Areas where a database can be used:

- ✍ Report card generation: a database can be used by schools to generate report cards and necessary academic summaries.
- ✍ POS (Point of Sale): in a supermarket, a database is used to design and automate a point of sale interface to manage money coming in, stock movement, e.t.c. e.g. Standard Supermarket in Kampala.
- ✍ Banks: a big database is used to manage details about a customer's transaction with the bank.
- ✍ Electoral commission: it manages a database archive for all eligible voters in a given country.
- ✍ Data warehouses: information bureau use a database to manage and distribute information to users for example information about air travel by various air companies.
- ✍ Stores: a database keeps consistent and reliable data. Very big stores used databases to store, manage and automate store records.

Common terms used in database management systems

- ❖ Data entry: The process of getting information into a database, usually done by people typing it in by way of data-entry forms designed to simplify the process.
 - ❖ DBMS: A program which lets you manage information in databases.
 - ❖ Field name (Field Labels): Is a title of a particular column (field) e.g. titles like ID No, Name, Sex, District, Allowance.
 - ❖ Field Length: Is the maximum number of characters that can be stored for data in a particular field.
 - ❖ Data type (Field Type): It specifies the type of data that the field can contain.
1. Data redundancy: Is the repeating of data in more than one file.

Database objects

These are the basic components that make up a database and they include:

1. **Tables** store your data in your database.
2. **Queries** ask questions about information stored in your tables.
3. **Forms** allow you to enter or view data stored in your tables.
4. **Reports** allow you to print data based on queries/tables that you have created.
5. **Designview**: This provides the tools for creating fields in a table and other objects.
6. **Datasheet view**: Allows one to update, edit and delete information from a table.
7. **Attribute**: a part of the description of an entity. The entity itself is described by one or more attributes e.g. the attributes for student can be name, Address, Telephone, etc.
8. **Macros (Mini programs)**: These are tools used to automate the way one uses his database. Macros can be used to instruct the computer to print specific reports at a given time.
9. **Modules**: These do the same work as a macro. They enable one to automate work processes.

Working with tables

A table contains data about a particular subject, such as employees or products. Each record in a table contains information about one item, such as a particular employee. A record is made up of fields, such as name, address and telephone number. A record is also commonly called a row, and a field is also commonly called a column.

ID	Company	First Name	Last Name
1	Company A	Anna	Bedecks
2	Company B	Antonio	Gratacos Solsona
3	Company C	Thomas	Axen

1. Record or row

2. Field or column

Your database can contain many tables, each storing information about a different subject. Each table can contain many fields of different types, including text, numbers, dates, and pictures.

The following list shows some common examples of tables you might create.

- a) A customers table that lists your company's customers and their addresses
- b) A catalog of products you sell, including prices and pictures for each item
- c) A tasks table that tracks tasks and due dates.
- d) An inventory of equipment or stock on hand.
- e) Academic scores obtained in an examination.
- f) Payroll details in a company.
- g) Fees payment by students.

Types of tables in a database

- 1. Flat file: A database that consists of a single table.
- 2. Related tables: refers to two or more tables that share similar attributes.

Types of databases

(i). Flat file database

-It is a database made up of only one table

- It is easy to set up and use

(ii). A relational database

-It is a database which can take information from two or more database tables and combine them into a new table or report.

NB: A relationship

It determines the way in which the details in one table are related to the details in another table. It can be a one to one relationship, one to many or many to many relationship.

3. Hierarchical database

It uses a structure in which records are divided into segments.

Each record contains one root segment and a variable number of subordinate segments that define a field within a record.

4. . The network databases (Online databases)

-It uses a linked list structure

- Combines records with links which are called pointers

- The pointers physically establish the relationships between records.

Data types used in a database

The following table describes the data types available for fields in Office Access 2007.

Data type	Stores
Text	Alphanumeric characters not used in calculations (for example, a product ID).
Memo (long Text)	Alphanumeric characters exceeding 255 characters.
Number	Use for storing numbers to be used in calculations, except for monetary values.
Date/Time	Use for storing date/time values. Note that each value stored includes both a date component and a time component.
Currency	Use for storing monetary values (currency).
AutoNumber	Note that AutoNumber fields can be incremented sequentially, by a specified increment, or chosen randomly.

Yes/No	Boolean values; Use for True/False fields that can hold one of two possible values: Yes/No or True/False, for example "F" or "M"
OLE (Object Linking and Embedding) Object	Use for storing OLE objects from other Microsoft Windows applications e.g. a picture, sound or a photograph.
Attachment	This is the preferred data type for storing digital images and any type of binary file.
Hyperlink	Provides single-click access to Web pages through a URL (Uniform Resource Locator).
Lookup Wizard	Creates a field that uses a combo box to look up a value in another table, query or list of values. It is not a data type however.

Characteristics of a good table:

- It should have a primary key.
- Should have fields and records.
- Should have formats and required data types.
- Should have the required number of records and fields.

What is a primary key?

It is a field that uniquely identifies a record in a table. Before saving a table, you should insert a primary key.

Characteristics of a good primary key

- ✍ It uniquely identifies each row.
- ✍ It is never empty or null — there is always a value.
- ✍ It rarely (ideally never) changes. Access uses primary key fields to quickly bring together data from multiple tables.

There are many other types of keys used in a database

- ✍ Foreign key: A key used in one table to represent the value of a primary key in a related table.
- ✍ Composite Primary Key – a primary key that is made up of more than one feature.
- ✍ Surrogate Primary Key – a system assigned primary key generally numeric and auto-incremented
- ✍ Candidate Key- a minimal superkey that does not contain a subset of features that it itself a superkey

Factors to consider before designing a database

- Size and nature of the work that need to be entered into a database.
- Number of users of the database and the usage patterns.
- How the database will be administered.
- Whether users need to update or delete records.
- Backups for previous databases, changes to other systems, integration to other systems, e.t.c.
- Future needs of the organization.
- Purpose of the database.
- Cost implication.

Field properties.

It refers to specific characteristics of a particular field. For example;

Use this field property	To
Field Size	Set the maximum size for data stored as a Text, Number, or AutoNumber data type.
Format	Customize the way the field appears when displayed or printed.
Decimal Places	Specify the number of decimal places to use when displaying numbers.
New Values	Set whether an AutoNumber field is incremented or assigned a random value.
Input Mask	Display editing characters to guide data entry.
Caption	Set the text displayed by default in labels for forms, reports, and queries.
Default Value	Automatically assign a default value to a field when new records are added.
Validation Rule	Supply an expression that must be true whenever you add or change the value in this field.
Validation Text	Enter text that appears when a value violates the Validation Rule expression.
Required	Require that data be entered in a field.
Allow Zero Length	Allow entry (by setting to Yes) of a zero-length string ("") in a Text or Memo field.
Indexed	Speed up access to data in this field by creating and using an index.

	index.
Unicode Compression	Compress text stored in this field when a large amount of text is stored (> 4,096 characters)
IME Mode	Control conversion of characters in an Asian version of Windows.
IME Sentence Mode	Control conversion of characters in an Asian version of Windows.
Smart Tags	Attach a smart tag to this field.
Append Only	Allow versioning (by setting to Yes) of a Memo field.
Text Format	Choose Rich Text to store text as HTML and allow rich formatting. Choose Plain Text to store only text.
Text Align	Specify the default alignment of text within a control.
Precision	Specify the total number of digits allowed, including those both to the right and the left of the decimal point.
Scale	Specify the maximum number of digits that can be stored to the right of the decimal separator.

Validation checks used in a database

- (i). **Allowed character checks:** checks and ascertains that only expected characters are present in a field.
- (ii). **Batch totals:** Checks for missing records. Numerical fields may be added together for all records in a batch. The batch total is entered and the computer checks that the total is correct.
- (iii). **Check digits:** The computer checks this calculation when data are entered.

- (iv). **Consistency checks:** Checks fields to ensure data in these fields corresponds, e.g., If Title = "Mr.", then Gender = "M".
- (v). **Control totals:** This is a total done on one or more numeric fields which appears in every record.
- (vi). **Cross-system consistency checks:** Compares data in different systems to ensure it is consistent, e.g., the address for the customer with the same id is the same in both systems.
- (vii). **Data type checks:** Checks the data type of the input and give an error message if the input data does not match with the chosen data type, e.g., In an input box accepting numeric data, if the letter 'O' was typed instead of the number zero, an error message would appear.
- (viii). **File existence check:** Checks that a file with a specified name exists. This check is essential for programs that use file handling.
- (ix). **Format or picture check:** Checks that the data is in a specified format (template), e.g., dates have to be in the format DD/MM/YYYY.
- (x). **Hash totals:** This is just a batch total done on one or more numeric fields which appears in every record. This is a meaningless total, e.g., add the Telephone Numbers together for a number of Customers.
- (xi). **Limit check:** Unlike range checks, data is checked for one limit only, upper OR lower, e.g., data should not be greater than 2 ($<=2$).
- (xii). **Logic check:** Checks that an input does not yield a logical error, e.g., an input value should not be 0 when there will be a number that divides it somewhere in a program.
- (xiii). **Presence check:** Checks that important data are actually present and have not been missed out, e.g., customers may be required to have their telephone numbers listed.
- (xiv). **Range check:** Checks that the data lie within a specified range of values, e.g., the month of a person's date of birth should lie between 1 and 12.
- (xv). **Referential integrity:** In modern Relational database values in two tables can be linked through foreign key and primary key. If values in the primary key field are not constrained by database internal mechanism,[4] then they should be validated. Validation of the foreign

key field checks that referencing table must always refer to a valid row in the referenced table.

(xvi). **Spelling and grammar check:** Looks for spelling and grammatical errors.

(xvii). **Uniqueness check:** Checks that each value is unique. This can be applied to several fields (i.e. Address, First Name, Last Name).

(xviii). **Table Look Up Check:** A table look up check takes the entered data item and compares it to a valid list of entries that are stored in a database table.

Database design basics

A properly designed database provides you with access to up-to-date and accurate information.

Query

A query asks questions about information stored in your tables. You use queries to retrieve specific data from your database and to answer questions about your data. For example, you can use a query to find the names of the employees in your database who live in a particular region.

A dynaset or 'Dynamic Subset': the subset of data created by a Query, which holds dynamic or live data (as opposed to a copy of the data).

A query criterion is a rule that identifies the records that you want to include in the query result.

Some of the common criteria include:

Criteria for Text, Memo, and Hyperlink fields

Criterion	Query result
"China"	Returns records where the field is set to China.
Not "Mexico"	Returns records where the field is set to a country/region other than Mexico.

Like U*	Returns records for all countries/regions whose names start with "U", such as UK, USA, and so on.
Not Like U*	Returns records for all countries/regions whose names start with a character other than "U".
Like **Korea**	Returns records for all countries/regions that contain the string "Korea".
Not Like **Korea**	Returns records for all countries/regions that do not contain the string "Korea".
Like "*ina"	Returns records for all countries/regions whose names end in "ina", such as China and Argentina.
Not Like "*ina"	Returns records for all countries/regions that do not end in "ina", such as China and Argentina.
Is Null	Returns records where there is no value in the field.
Is Not Null	Returns records where the value is not missing in the field.
"" (a pair of quotes)	Returns records where the field is set to a blank (but not null) value.
Not ""	Returns records where the field has a nonblank value.
"" Or Is Null	Returns records where there is either no value in the field, or the field is set to a blank value.
Is Not Null And Not ""	Returns records where the field has a nonblank, non-null value.
>= "Mexico"	Returns records of all countries/regions, beginning with

	Mexico and continuing through the end of the alphabet.
Like "[A-D]*"	Returns records for countries/regions whose names start with the letters "A" through "D".
"USA" Or "UK"	Returns records for USA and UK.
In("France", "China", "Germany", "Japan")	Returns records for all countries/regions specified in the list.
Right([Country Region], 1) = "y"	Returns records for all countries/regions where the last letter is "y".
Len([Country Region]) > 10	Returns records for countries/regions whose name is more than 10 characters long.
Like "Chi??"	Returns records for countries/regions, such as China and Chile, whose names are five characters long and the first three characters are "Chi".

Criteria for Number, Currency, and AutoNumber fields

The following examples are for the Unit Price field in a query that is based on a table that stores products information. The criterion is specified in the Criteria row of the field in the query design grid.

Criterion	Query Result

100	Returns records where the unit price of the product is \$100.
Not 1000	Returns records where the unit price of the product is not \$1000.
< 100 <= 100	Returns records where the unit price is less than \$100 (<100). The second expression (<=100) displays records where the unit price is less than or equal to \$100.
>99.99 =>99.99	Returns records where the unit price is greater than \$99.99 (>99.99). The second expression displays records where the unit price is greater than or equal to \$99.99.
20 or 25	Returns records where the unit price is either \$20 or \$25.
>49.99 and <99.99 -or- Between 50 and 100	Returns records where the unit price is between (but not including) \$49.99 and \$99.99.
<50 or >100	Returns records where the unit price is not between \$50 and \$100.
In(20, 25, 30)	Returns records where the unit price is either \$20, \$25, or \$30.
Like "*4.99"	Returns records where the unit price ends with "4.99", such as \$4.99, \$14.99, \$24.99, and so on.
Is Null	Returns records where no value is entered in the UnitPrice field.
Is Not Null	Returns records where the value is not missing in the UnitPrice field.

Criteria for Date/Time fields

The following examples are for the OrderDate field in a query based on a table that stores Orders information. The criterion is specified in the **Criteria** row of the field in the query design grid.

Criterion	Query result
#2/2/2006#	Returns Feb 2, 2006. Remember to surround date values with the # character so that Access can distinguish between date values and text strings.
Not #2/2/2006#	Returns records that took place on a day other than Feb 2, 2006.
< #2/2/2006#	Returns records of transactions that took place before Feb 2, 2006.
> #2/2/2006#	Returns records of transactions that took place after Feb 2, 2006. To view transactions that took place on or after this date, use the >= operator instead of the > operator.
>#2/2/2006# and <#2/4/2006#	Returns records where the transactions took place between Feb 2, 2006 and Feb 4, 2006. You can also use the Between operator to filter for a range of values. For example, Between #2/2/2006# and #2/4/2006# is the same as >#2/2/2006# and <#2/4/2006# .
<#2/2/2006# or >#2/4/2006#	Returns records where the transactions took place before Feb 2, 2006 or after Feb 4, 2006.
#2/2/2006# or	Returns records of transactions that took place on either Feb 2, 2006

#2/3/2006#	or Feb 3, 2006.
In (#2/1/2006#, #3/1/2006#, #4/1/2006#)	Returns records where the transactions took place on Feb 1, 2006, March 1, 2006, or April 1, 2006.
DatePart("m", [SalesDate]) = 12	Returns records where the transactions took place in December of any year.
DatePart("q", [SalesDate]) = 1	Returns records where the transactions took place in the first quarter of any year.
Date()	Returns records of transactions that took place on the current day. If today's date is 2/2/2006, you see records where the OrderDate field is set to Feb 2, 2006.
Date()-1	Returns records of transactions that took place the day before the current day. If today's date is 2/2/2006, you see records for Feb 1, 2006.
Date() + 1	Returns records of transactions that took place the day after the current day. If today's date is 2/2/2006, you see records for Feb 3, 2006.
Between Date() and Date()-6	Returns records of transactions that took place during the last 7 days. If today's date is 2/2/2006, you see records for the period Jan 24, 2006 through Feb 2, 2006.
Between Date() And DateAdd("M", -1, Date())	A month's worth of sales records. If today's date is 2/2/2006, you see records for the period Jan 2, 2006. to Feb 2, 2006

< Date()	Returns records of transactions that took place before today.
> Date()	Returns records of transactions that will take place after today.
Is Null	Returns records where the date of transaction is missing.
Is Not Null	Returns records where the date of transaction is known.

Forms & reports

- a) Forms: Forms give you the ability to choose the format and arrangement of fields. You can use a form to enter, edit, and display data.
- b) Reports: Reports organize or summarize your data so you can print it or view it onscreen. You often use reports when you want to analyze your data or present your data to others.

Data

validation

Validation- Is the process of comparing the data entered with a set of predefined rules or values to check if the data is acceptable. Validation is the name for the checks that detect incorrect data, display an error message and request another input or just reject the data.

Data Validation - is the checking of input data for errors (e.g., of the correct data type) before processing. Common data validation checks are included below:

Validation Rules

Validation rules prevent bad data from being saved in your table. Basically, they look like criteria in a query.

Validation Rules for fields

When you select a field in table design, you see its Validation Rule property in the lower pane.

This rule is applied when you enter data into the field. You cannot tab to the next field until you enter something that satisfies the rule, or undo your entry.

examples:

SYSTEM SECURITY, ICT

ETHICAL ISSUES &

EMERGING

TECHNOLOGIES

Chapter contents

Computer security system

Privacy & ICT ethical issues

Emerging technologies

ICT industry

Chapter questions

A computer system consists not only of software, hardware, data / information, and procedures but also of people –the users of the computer system. People can use computer systems for both good and bad purposes, and they may be self-assured or not when they use them. But regardless of how they use them or how they feel about them, most people realize that computers have changed the way we live.

UNEBC 2017 Qn 5(a) state four categories of the components of a computer system(04 marks)

(b) Give the function of any one category you have stated in 5(a) (01 mark)

The deeper computer technology reaches into our lives, the more questions we should be asking ourselves. For example: what are the consequences of the widespread presence of computer technology? Is computer technology creating more problems than its solving? In the following sections we examine some critical issues related to the widespread use of computers.

Objectives

To discuss the issue of computers and the unethical invasion of privacy through the use of databases and networks

Name some of the things that credit reporting bureaus are doing to improve report accuracy and protect data.

Discuss the major laws passed in Uganda to protect citizen's privacy and prevent the misuse of computers.

Define computer crime and give some examples of it , along with the ways to protect computer security.

Discuss the major hazards for computer systems.

Define software piracy and describe what freeware, shareware and public domain software are.

Computer Security ethics and Privacy

A computer security risk is any event or action that causes a loss or damage to computer hardware, software, data, or information.

 Some abuses to computer security are accidental, but some are planned.

 Any illegal act involving a computer is generally referred to as a computer crime.

 Cybercrime refers to online or Internet-based illegal acts.

Internet and network attacks.

An attack can be defined as an illegal access to the computer or network by an individual or software. Examples of attacks include;

- Virus attack**

i. **Viruses**: is a small piece of software that is attached on real programs and disorganizes their mode of operation.

Denial of service attacks (DoS)

A type of attack conducted over the Internet, using the combined resources of many computers to attack, and often to crash a targeted computer system or resource (e.g., a program, website or network).

Back Door Attacks

Back Door attacks use programs that provide a method for entering a system without going through the usual authentication process.

Authentication is the process of proving a user's identity before accessing a computer system.

Man in the Middle Attacks

As the name implies, such an attack involves the secret assignment of a software agent between the client and server ends of a communication. In this situation neither end of the communication is aware that the malicious agent is present in the line of communication.

The best way to avoid such attacks is to use encryption and secure protocols in all communications.

Replay Attacks

The data is transacted just like in the case of the man in the middle attack only that for this case, it is recorded, modified and then transmitted to the client for wrong purposes.

Password Guessing and cracking

A password is a collection of characters that are entered into a system for purposes of proving the identity of the user.

On systems which rely only on a login name and password the security of the entire system is only as strong as the passwords chosen by the users.

Password guessing involves the intruder trying out some words which he/she predicts could be the passwords. No technical knowledge is involved.

Password cracking involves use of special tools to break the security by either overwriting the password or bypassing it.

Guidelines to creating a strong password

- ✓ Should be at least eight characters long
- ✓ Should include both lower case and upper case characters. E.gEmhoGoNow.
- ✓ Should include numbers and letters of the alphabet e.g 1620school
- ✓ Should also include punctuation marks such as the comma, colon etc. egpc@comp:dept
- ✓ Avoid using your names or friends names.

1. Unauthorized access and use:

Unauthorized access is the use of a computer or network without permission.

A cracker, or hacker, is someone who tries to access a computer or network illegally.

Some hackers break into a computer for the challenge. However, others use or steal computer resources or corrupt a computer's data.

Unauthorized use is the use of a computer or its data for unapproved or possibly illegal activities.

Examples of unauthorized use of computers include;

- ✍ An employee using a company computer to send personal e-mail.
- ✍ Someone gaining access to a bank computer and performing an unauthorized transfer.
- ✍ Circulating pornography over the network.
- ✍ Transmitting viruses over the network.

One way to prevent unauthorized access and unauthorized use of computers is to utilize access controls.

2. Hardware theft and vandalism:

Hardware theft is the act of stealing computer equipment.

The act of defacing or destroying computer equipment is known as hardware vandalism.

Precautions to prevent hardware theft include

- ✓ Use physical access controls, such as locked doors, and windows.
- ✓ Use cables to lock the equipment to desk, cabinet, or floor.
- ✓ Install alarm systems for additional security.
- ✓ Never leave a notebook computer or handheld computer unattended in a public place.
- ✓ Use passwords, possessed objects, and biometrics as a method of security.
- ✓ Back up all the files stored on the computer regularly.
- ✓ Install surveillance cameras (CCTV).

3. Software theft:

Two common forms of software theft are:

- a) Physically stealing media (e.g., floppy disk, or CD-ROM) that contains software; and
- b) Software piracy, which is the most common form of software theft. Software piracy refers to the unauthorized and illegal duplication of copyrighted software.

Licensing software

A software license refers to the agreed terms of use between the software developer and the software user.

Types of software license

- a) A single - user license agreement or end-user license agreement is the most common type of license included with software packages purchased by individual users.
- b) A software site license gives the buyer the right to install the software on multiple computers at a single site (e.g., a school computer laboratory).
- c) A network site license allows network users to share a single copy of the software, which resides on the network server.

Risks of software piracy include

- a) Increase the chance of spreading computer viruses.
- b) No technical support for the software can be received.
- c) Drive up the software cost for all legal users.

4. Information theft

Information theft refers to stealing personal or confidential information from others.

Reasons for information theft include

- a) A company wants to learn about a competitor.
- b) An individual steals credit card numbers to make fraudulent purchases.

Preventions for information theft include

- c) Implement access control to computers and networks.

An access control is a security measure that defines

- ✓ Who can access a computer
- ✓ When the users can access the computer
- ✓ What actions the users can take while accessing the computer

Access control is normally implemented using a two-phase process:

- ✓ Identification verifies whether the user is a valid one.
- ✓ Authentication verifies that the user is really the one he or she claims to be.

Methods of identification and authentication exist, which include;

a) User names and passwords

- ✓ Most multi-user operating systems require a user to enter the correct user name and password before accessing the data, information, and programs stored on a computer or network.

b) Possessed objects: A possessed object is any item that a user must carry to gain access to a computer or computer facility.

Examples of possessed objects include badges, cards, and keys.

- ✓ Possessed objects are often used in combination with personal identification numbers.
- ✓ A personal identification number (PIN) is a numeric password, either assigned by a company or selected by a user.
- ✓ PINs provide an additional level of security.

c) **Biometric devices:** authenticates a person's identity by verifying personal characteristics (e.g., fingerprints).

It translates a personal characteristic into a digital code that is compared with a digital code stored in the computer.

Examples of biometric devices include:

- ✓ A fingerprint scanner, which captures curves and indentations of a fingerprint.
- ✓ A hand geometry system, which can measure the shape and size of a person's hand.
- ✓ A face recognition system, which captures a live face image and compares it with a stored image.
- ✓ A voice recognition system, which compares a person's live speech with their stored voice pattern.
- ✓ A signature verification system, which recognizes the shape of handwritten signature of a person.
- ✓ An iris recognition system, which reads patterns in the tiny blood vessels in the back of the eye, which are as unique as a fingerprint.

Advantages of biometric devices include:

- Personal characteristics are unique and cannot be forgotten or misplaced.

Disadvantages of biometric devices include

- Most of the biometric devices are expensive.
- A fingerprint scanner might reject a legitimate user if the user cuts his or her finger.
- Hand geometry readers can transmit germs.

- A signature might not match the one on file when the person is nervous.
- A voice recognition system might reject a legitimate user with a sore throat.

Guidelines for ensuring security of computer systems

- Maintain a log that records in a file both successful and unsuccessful access attempts.
- Investigate unsuccessful access attempts immediately to ensure they were not intentional breaches of security.
- Review successful access for irregularities, such as use of the computer after normal working hours or from remote computers.
- Have written policies regarding the use of computers by employees for personal reasons.
- Document and explain the policy of computer use to employees.
- Use encryption techniques

5. System failure

A system failure is a prolonged malfunction of a computer that can also cause hardware, software, data, or information loss. Common causes of system failure include:

- Aging hardware
- Natural disaster (e.g., fires, floods, storms, or earthquakes)
- Electrical power variation. Electrical power variations can cause loss of data or equipment. A single power disturbance can damage multiple systems in a computer network.

Electrical power disturbances include

- Noise is any unwanted signal, usually varying quickly, which is mixed with the normal voltage entering the computer.
- An under voltage occurs when the electrical supply drops

- An over voltage, or power surge, occurs when the incoming electrical power increases significantly above the normal 220 volts.

- ✓ A surge protector can be used to protect computer equipment against under voltage and over voltage.
- ✓ Many users also connect an uninterruptible power supply to the computer for additional electrical protection.
- ✓ Files should be backed up regularly to protect against data loss caused by a system failure.

6. **Backing up**

A backup is a duplicate of a file, program, or disk that 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 a fireproof and heatproof safe or offsite.

Types of backup

- a) Full backup, which copies all of the files in the computer.
- b) Differential backup, which copies only the files that have changed since the last full backup.
- c) Incremental backup, which copies only the files that have changed since the last full or last incremental backup.

7. **Wireless security**

Wireless networks are much more at risk to unauthorized use than cabled networks. Three basic techniques are used to protect networks from unauthorized wireless use. Use any or all of these techniques when setting up your wireless access points:

a) Encryption

Encryption is the process of converting readable data into unreadable characters to prevent unauthorized access.

Or Encryption is a method of scrambling the content into a form known as cipher, which is unreadable until it is unscrambled in order to protect that data from being viewed by unauthorized individuals.

Enable the strongest encryption supported by the devices you will be connecting to the network. Use strong passwords (strong passwords are generally defined as passwords containing symbols, numbers, and mixed case letters, at least 14 characters long).

b) Isolation

Use a wireless router that places all wireless connections on a subnet independent of the primary private network. This protects your private network data from pass-through internet traffic.

c) Hidden SSID

Every access point has a Service Set Identifier (SSID) that by default is broadcast to client devices so that the access point can be found. A network SSID in simplest terms is the network name. By disabling this feature, standard client connection software won't be able to "see" the access point.

8. Computers and health risks

Prolonged computer usage can lead to health risks such as

- a) Eye strain
- b) Back pain due to poor sitting posture
- c) Electromagnetic radiation especially with CRT monitors
- d) Addiction from use
- e) Wrist pain due to non-ergonomic
- f) Repetitive Strain Injury(RSI)
- g) Headaches
- h) Neck pain
- i) Stress due to noise from fans, printers, power inputs
- j) Ear problems for use of ear phones especially with embedded systems

Precautions to help prevent such risks include

- a) Pay attention to sitting posture.
- b) Take a break to stand up, walk around, or stretch every 30 to 60 minutes.
- c) Place the display device about an arm's length away from the eyes with the top of the screen at eye level or below.
- d) Adjust the lighting in the room.
- e) Ensure that the workplace is designed ergonomically.

Ergonomics means adding comfort, efficiency, and safety into the design of items in the workplace.

- *Some keyboards have built-in wrist rests.*
- *Most display devices have a tilt-and-swivel base and controls to adjust the brightness, contrast, positioning, height, and width of images.*

9. Computer ethics

Are the moral guidelines that govern the use of computers and information systems.

Frequently concerned areas of computer ethics are

- a) Unauthorized access and use of computer systems
- b) Software piracy
- c) Information privacy: Information privacy refers to the right of individuals or organizations to deny or restrict the collection and use of information about them.
- d) Information accuracy: Information accuracy becomes an important issue when it is necessary to access information maintained by other people or companies, such as that on the Internet. Inaccurate input can result in erroneous information and incorrect decisions made based on that information. Never assume that information provided on the Web is always correct.

10. Intellectual property rights

Intellectual property (IP) refers to work created by inventors, authors, and artists. Intellectual property rights are the rights to which creators are entitled for their work.

- ✓ A copyright gives authors and artists exclusive rights to duplicate, publish, and sell their materials.
- ✓ A common infringement of copyright is software piracy.
- ✓ Copyright law usually gives the public fair use to copyrighted material (e.g., for educational purposes).
- ✓ A trademark protects a company's logos and brand names.

Codes of conduct

A code of conduct is a written guideline that helps to determine whether a specific action is ethical or unethical.

Codes of Conduct: A code of conduct is a voluntary set of rules which people agree to follow or abide by. Codes of Conduct are not legally binding but once someone agrees to abide by it, then it is considered binding.

A sample IT code of conduct include

- a) Computers may not be used to harm other people.
- b) Users may not interfere with other's computer work.
- c) Users may not meddle in other's computer files.
- d) Computers may not be used to steal.
- e) Computers may not be used to bear false witness.
- f) Users may not copy or use software illegally.
- g) Users may not use other's computer resources without authorization.

- h) Users may not use other's output.
- i) Users shall consider the social impact of programs and systems they design.
- j) Users should always use computers in a way that demonstrates consideration and respect for other people.

11. Information privacy

Information privacy or data privacy is the relationship between collection and distribution of data, technology and the legal issues surrounding them. This includes the following:

a) Electronic profiles

Involves keeping details concerning online user of a specific service or product. It involves, writing personal details so as to be allowed to use the service.

Remember how you obtained your e-mail address; you filled a form related to your details. This profile is never viewable by third parties unless otherwise.

b) Cookies

A cookie is a small text file that a web server stores on your computer that allows a site to track the actions of its visitors.

c) Spam

Spam is the use of electronic messaging systems to send unwanted bulk messages, especially advertising, at random.

d) Phishing

Phishing is the act of attempting to acquire information such as usernames, passwords, and credit card details (and sometimes, indirectly, money) by hiding as a trustworthy unit in an electronic communication.

e) Pharming

Is an attack intended to redirect a website's traffic to another, fake site.

f) Spywares

Spyware is a type of malicious program installed on computers that collects information about users without their knowledge. The presence of spyware is typically hidden from the user and can be difficult to detect. Some spyware, such as key loggers, may be installed by the owner of a shared, corporate, or public computer intentionally in order to monitor users.

g) Adware

Adware, or advertising-supported software, is any software package which automatically renders advertisements in order to generate revenue for its author

h) Privacy laws

Privacy law refers to the laws which deal with the regulation of personal information collected by individuals, government or private organizations.

Privacy laws are considered in the context of an individual's privacy rights or reasonable expectation of privacy.

i) Social engineering

In the situation of security, it is understood to mean the art of influencing people into performing actions or revealing confidential information.

j) Employee monitoring

Aspects of employee monitoring include

- **E-mail scanning:** is a process in which incoming and outgoing mail passes through E-mail filtering software to search for content which may violate the policies of the employer.
- **Video surveillance:** This involves recording or watching live all the activities an employee carries out from his computer.

This is a benefit because it provides an unbiased method of performance evaluation and prevents the interference of a manager's feelings in an employee's review.

Location monitoring: For employees that do not work in a static location, supervisors may choose to track their location. Common examples of this are delivery and transportation industries.

- **Legal issues:** It is illegal to perform monitoring, such as reading an employee's emails, unless it can be shown that it is a necessary precaution and there are no other alternatives. Everyone in the conversation must give consent before the conversation can be recorded.

The following uses of employee information are generally considered legal:

- ✓ Find needed business information when the employee is not available.
- ✓ Protect security of proprietary information and data.
- ✓ Prevent or investigate possible criminal activities by employees.
- ✓ Prevent personal use of employer facilities.
- ✓ Check for violations of company policy against sending offensive or pornographic email.
- ✓ Investigate complaints of harassment.
- ✓ Check for illegal software.
- **Security:** In some cases, monitoring an employee's work leads to monitoring the employee's life in aspects that are not related to work. This leads to obtaining of information about the employee, compromising the security of employee.

k) Content filtering

This is the process of restricting access to certain material on the web. Many businesses use content filtering to limit access to the web.

12. Computer crime

Computer crime refers to an illegal act committed on or with the help of the computer. In other words, it is a computer based illegal act.

Examples of computer crimes

- Software piracy
- Copying of confidential information without permission.
- Circulating pornography over the network.
- Writing and distributing viruses

Cybercrime is an online based illegal act

All cybercrimes are computer crimes but not all computer crimes are cybercrimes.

EMERGING TECHNOLOGIES

1. Artificial intelligence

Artificial intelligence is a major feature of the fifth computer generation. It enables computers to behave and reason like human beings.

Application of artificial intelligence

a) Game playing

You can buy machines that can play master level chess. There is some AI in them, but they play well against people mainly through bully force computation--looking at hundreds of thousands of positions.

b) Speech recognition

The ability of computer systems to recognize spoken words.

c) Understanding natural language

Computers can be trained to learn and take instructions using natural languages. This is possible in some developed countries where robots understand this process.

d) Computer vision

The ability of computer systems to view images and videos in three dimensions. The world is composed of three-dimensional objects, but the inputs to the human eye and computers' TV cameras are two dimensional.

e) Expert systems

A “knowledge engineer” interviews experts in a certain field and tries to represent their knowledge in a computer program for carrying out some task. How well this works depends on whether the academic method required for the task is within the present state of AI.

f) Computer science

AI researchers have created many tools to solve the most difficult problems in computer science. All of the following were originally developed in AI laboratories:

- ★ Time sharing.
- ★ Interactive interpreters.
- ★ Graphical user interfaces and the computer mouse,
- ★ Rapid development environments.
- ★ The linked list data structure.
- ★ Automatic storage management.
- ★ Symbolic programming.
- ★ Functional programming.
- ★ Dynamic programming and object-oriented programming.

g) Finance

Banks use artificial intelligence systems to organize operations, invest in stocks, and manage properties. In August 2001, robots beat humans in a simulated financial trading competition.

h) Hospitals and medicine

A medical clinic can use artificial intelligence systems to organize bed schedules, make a staff rotation, and provide medical information.

Artificial neural networks are used as clinical decision support systems for medical diagnosis. Other tasks in medicine that can potentially be performed by artificial intelligence include;

- ✓ Computer-aided interpretation of medical images.
- ✓ Heart sound analysis

i) Heavy industry

Robots have become common in many industries. They are often given jobs that are considered dangerous to humans.

j) Transportation

Hairy logic controllers have been developed for automatic gearboxes in automobiles. The gear box automatically engages a necessary gear to enable the car move without much task from the driver.

k) Telecommunications

Many telecommunications companies make use of heuristic search in the management of their workforces.

l) Music

The evolution of music has always been affected by technology. With AI, scientists are trying to make the computer emulate the activities of the skillful musician. Composition, performance, music theory, sound processing are some of the major areas on which research in Music and Artificial Intelligence are focusing.

m) Aviation

Artificial intelligence is used in air craft control such as the civil aviation authority. It helps in training pilots through simulations.

2. Digital forensics

Digital forensics (sometimes known as **digital forensic science**) is a branch of investigative science around material found in digital devices, often in relation to computer crime for example, hacking, cracking, spamming, e.t.c.

Branches of digital forensics include

- **Computer forensics**

The goal of computer forensics is to explain the current state of a digital object; such as a computer system, storage medium or electronic document.

- **Mobile device forensics**

Mobile device forensics is a sub-branch of digital forensics relating to recovery of digital evidence or data from a mobile device.

- **Network forensics**

Network forensics is concerned with the monitoring and analysis of computer network traffic, both local and WAN/internet, for the purposes of information gathering, evidence collection, or crime detection

- **Database forensics**

Database forensics is a branch of digital forensics relating to the forensic study of databases and their metadata.

CAREERS IN THE COMPUTER INDUSTRY

The overall computer technology field is growing, thanks to the increasing trust of business and everyday affairs on computers.

This is great news indeed for those looking to join the field. One of the only computer related jobs to be wary of are positions in computer programming, as much of this work is being outsourced to different countries. However, most other computer related professions are experiencing an exciting growth.

The Fastest Growing Jobs in Computer related career:

1. Computer and Information System Management

- a) These professionals serve as technology managers and decision makers within an institution or on a consulting basis.

- b) They ensure that the information technology and telecommunications of the company work and run smoothly.
- c) They oversee such areas as software development, network security, and Internet operations.
- d) They solve any technological problem, and therefore troubleshoot quickly and effectively, and are to work under stressful circumstances and deadlines.

2. Computer Scientist

- a) He/she can perform a wide range of jobs in information technology and related fields.
- b) A computer scientist often uses current forms of technology, or creates new ones, in order to solve complex problems, thus applying information technology principles to real-world situations.
- c) Computer scientists work as robotics researchers, hardware designers, software engineers, technology consultants, and systems analysts for universities, government organizations, and private corporations.

3. Computer Support Specialist

- a) A computer support specialist assists people when they are having technical trouble with their computers. It is their responsibility to identify any technological problems and then try to fix them.
- b) Computer support specialists are also usually responsible for installing everything from software, printers, Wi-Fi, and other computer tools and components.
- c) Once installed, they also teach customers how to properly use the new devices and even write instructional handbooks.

4. Computer Systems Analyst

- a) The analysts formulate a plan and design (or perfect) systems that will help the company achieve their goals. For example, a large retail store or food corporation might want a systems analyst to create a new computerized inventory system.
- b) The analyst is responsible for specifying all the details from beginning to end when configuring a new system; including determining if the system is economically possible.

- c) He configures all hardware and software components, creating flow charts describing the systems progress during the initial developmental stages and experimenting with the system repeatedly to ensure it works properly at the end.

5. Computer Systems Designer

- a) They create computer and IT systems that allow businesses and other entities to operate effectively and efficiently.
- b) As a computer systems designer, you will facilitate these computer and IT systems, working to design custom software programs, manage computer and information systems, as well as manage computer facilities.

6. Computer Programmer

- a) Computer programmers often work with software engineers to convert a newly designed application into functional computer code so that the computer can understand the instructions and run the program.
- b) Essentially, computer programmers implement the designs of software engineers, using programming languages such as C++ to write the program so that it runs efficiently.
- c) Computer programmers also maintain and update already existing applications.
- d) They can repair buggy programs.

7. Database Administrator

- ✍ Database administrators are responsible for handling the information stored on the computer databases of various businesses and organizations.
- ✍ They come up with effective ways of storing, organizing, analyzing, using and presenting this data.
- ✍ Some database administrators even participate in the design of databases.

8. Network Administrator

- ★ Network administrators are responsible for building an organization's computer network.
- ★ Managing, and repairing an organization's computer networks.

- ★ Network administrators handle a company's Local Area Networks (LANs), Wide Area Networks (WANs) and network segments, as well as manage the company's Internet and intranet systems.
- ★ They must install and maintain hardware and software that supports an organization's networks, making sure everything is working the way it is supposed to be.

9. Network System Analyst

- A network system analyst is an expert in the relationship between computers and various networks, like local area networks (LAN), wide area networks (WAN), the Internet, intranets and other communications systems.
- They design and implement networks according to their clients' specific business and telecommunications needs.
- These professionals can also manage and supervise other Information Technology (IT) team members, like computer programmers or web designers.

10. Software Engineer

- Software engineers create and develop all kinds of software programs, such as video games, computer operating systems, network systems, business applications, and so on.
- Based on the user's needs, software engineers construct and test various version of an application.

Preparing for a career in the computer industry

There are many career opportunities in the computer industry. It is important for one to consider taking up subjects that are essential like Maths, Physics since many professional courses rotate around this. Other career opportunities do not need any bias in Maths and Physics like working as an internet café attendant. One therefore needs to prepare appropriately depending on the career one chooses.

Note:

The following terms may be used in this chapter;

Computer sabotage: An act of malicious destruction to a computer

Bot: A computer that is controlled by a hacker or other computer criminal.

Botnet: A group of bots that are controlled by one individual.

Digital certificate: A group of electronic data that can be used to verify the identity of a person or organization, includes a key pair that can be used for encryption and digital signature (also called digital ID).

Wifi piggybacking: Accessing an unsecured wifi-network from your current location without authorization.

Cyber bullying: children or teenagers bullying other children or teenagers via the internet.

Cyber stalking: Repeated threats or harassing behavior between adults carried out via email or another internet communication method.

Chapter questions

1(a) what is meant by computer security (01 mark)

(b) With relevant examples explain the various forms of computer security (04 marks)

2(a) Explain the meaning of “hardware security threats” (02 marks)

(b) Mention any three possible threats to data security (03 marks)

3(a) Briefly explain the meaning of the following terms as regards to computer security(05 marks)

- (i) Hacking
- (ii) Denial of service attack
- (iii) Back door attack
- (iv) Data masking
- (v) Cracking

4(a)explain any three network attacks (03 marks)

(b) Suggest ways of protecting against each of any two of the above network attacks (02 marks)

5(a) Explain the term backup as regards to computer security (02 marks)

(b) give instances where a backup is required (03 marks)

6(a) what is meant by the term computer crime (01 mark)

(b) Briefly describe any four forms of computer crime (04 marks)

7(a) what is meant by computer fraud (02 marks)

(b) Mention three forms of computer fraud (03 marks)

8(a) Explain the term cyber stalking (02 marks)

(b) Write down three forms of cyberstalking (03 marks)

9(a) Explain the following terms as used in computer security (05 marks)

- (i) Spyware
- (ii) Password
- (iii) Authentication
- (iv) Log files
- (v) Firewall

10 Explain any five careers related to the ICT industry (05 marks)

GLOSSARY

Address Register

A register that holds instruction or pieces of data in a specific memory location.

Analog

A computer that does not count in two digits, but rather continuously measure and compares changing values.

Application Software

Computer program used by knowledge workers to produce useful work.

Arithmetic-Logic Unit (ALU)

The electronic circuitry in the CPU that performs the arithmetic and logical operations; one of three components of the central processing unit.

Artificial Intelligence

A software technology that attempts to replicate many human thought processes (such as reasoning, learning, self improvement, and associative learning) in a computer. See expert system.

Ascii

A acronym for America Standards Code for information Interchange. A standard for telecommunications and application file transfer requiring that all the special codes and formats from the application program be stripped from a file. Also called a text file.

Assembler

Software that translates assembly language into machine language.

Assembly language

A programming language that uses letters, numbers, and symbols to represent individual 0s and 1s.

Attribute

A characteristic of an entity.

Automatic call dialing (ACD)

A computer –managed electronic dialing function for outgoing calls.

Automatic number identification (ANI)

A computer assisted operation used to identify from the telephone network the number of the caller dialing in displaying it on a computer screen or an LCD readout.

Auxiliary Storage

Used to keep instruction and data more permanently. Also known as storage device.

Backspace

A computer keyboard key that deletes the previously typed character.

Backup

The process of making duplicate copies of programs and files for safekeeping.

Bandwidth

The capacity of a communications channel to carry data or information.

Basic

The most popular programming language used by personal computer owners; most commonly an instructed language.

Batch Processing

Taking data that is collected in a batch over a period of time and then usually input, processed, and output all at once.

Binary Number System

A number system based on just two numbers or digits, 1 and 0.

Bit

The basic unit of data recognized by a computer.

Boot

Loading the operating system in computer memory.

Bridge

Computer circuitry that links phones and computers together.

Bug

A program or hardware problem.

Bus Network

A network with no central computer that shares other network resources in common.

Byte

A group of bites that can be operated on as a unit by the computer.

C language

A programming language similar to assembly language, but incorporating many of the statement features of high-level languages.

Cache Memory

A small memory accumulation area, part of either the CPU integrated circuit chip or a software program that creates an additional memory staging area just before the CPU where instructions can be gathered for more efficient processing.

Calculate

An automatic calculation command built into the spreadsheet's operation.

Cap lock

A key board key used to lock the keyboard for typing capital letters.

Cell

A square on the spreadsheet screen indicating where to type in data.

Cell pointer

Illuminates the particular cell it is located in, taking the place of the cursor to indicate where data may be entered.

Center

To place text equidistant from each side of the page.

Centralized Computing

The concept of keeping all MIS functions in one location or facility.

Central Processing Unit (CPU)

The computer component that executes instruction and processes data.

Character

A single symbol, letter, number, or punctuation mark defined in the database.

Character-based

An application program capable of displaying only ASCII text, not graphics.

Click and drag

A technique used with pointing devices, such as the mouse, to issue commands and accomplish tasks.

Client

A PC used by a knowledge worker; the “front end” of a client/ server system.

Client Server

A database system used by a group of knowledge workers in a specific work group, division or department.

Client Server Computing

A hardware architecture that takes advantage of the processing power of two computers working together to perform a task.

Cluster

Individual storage compartments on a disk, defined by their track and sector designation.

COBOL

A structured programming language most widely used in business, a structured language

Coding

Programming in a specific programming language or language; creating source code for the program.

Column

The cells running vertically down the spreadsheet screen.

Command

An instruction given to the computer.

Command language

A common vocabulary of codes words, and phrases used to communicate quickly and efficiently with the CPU.

Command line

The portion of the screen where instruction are issued.

Command line interface.

A human-computer interface that requires typing a command in the proper syntax.

Communications channel

A physical means of connecting the communicating computers so they can exchange the programs or data.

Communication protocol

A rule and standard that makes it possible for two computers to communicate with each other.

Communication software

An application programmed with telephone number to dial a modem and connect to another computer, to send or receive data communication.

Compact disc-read only memory (CD-ROM)

Auxiliary storage medium that uses laser technology instead of magnetic to read and write to a CD-sized disk. See write once read many.

Compiler

Software that translates entire files of source code into object code, which in turn becomes an executable file.

Complex-instruction-set computing (CISC)

A microprocessor or CPU architecture and operating system design that recognizes 100 or more instructions. See reduced-instruction-set computing.

Computer-aided acquisition and logistics support (CALS)

A U.S department of defense program for image processing and paperless document management associated with the design manufacture, acquisition, and maintenance of weapons systems.

Computer literacy

Being knowledgeable or educated about the computer and how it works in our daily lives.

Computer system

People, using data and procedures, to work with software and hardware components.

Computer virus

A program that corrupts or infects computer files by inserting a copy of the virus itself into those files.

Computer worm

A program that damages computers by duplicating itself from one computer's memory to the next.

Concentrator

A controller and multiplexer combined into one peripheral to manage, amplify, and ensure the integrity of data signals.

Configuration

The various hardware components that make up a computer system.

Control (Ctrl)

A computer keyboard key used in conjunction with standard keyboard keys to issue commands or instructions to the application software.

Control unit

One of the three components of the central processing unit, directs the step by step operation of the computer.

Cut and paste

Moving portions of files, often created by different application from one file to another.

Cycle

The length of time it takes the CPU to process one machine instruction.

Cylinder

A vertical stack of tracks on a disk.

Daisy wheel

A printer with a print hammer that strikes each petal of a plastic print wheel against a ribbon to form an impression.

Data

Facts and numbers suitable for communication or interpretation. A single unit of data may be termed a datum, technically data is the plural term.

Database

A group of related records and files.

Database administrator

The information systems professional responsible for maintaining the DBMS as well as for ensuring the accuracy and integrity of its data.

Database application

A program designed to extract and organize specific data, and then present it on the computer screen and in printed reports.

Database design

Planning and nature and purpose of the database using paper and pencil.

Database development

Managing the DBMS and administering to the database.

Database management system (DBMS)

Application software that lets you organize, store and retrieve data from a single database or several database.

Database service

An on line information service whose primary purpose is to provide comprehensive information.

Database collection device

A source-data input computer like device used for such tasks as scanning UPC codes for inventory purposes.

Data definition

Creating a detailed description of the data.

Data dictionary

A list of all the fields, files, and commands utilized in manipulating a database.

Data disk

The disk on which work is stored.

Data entry

The process of entering data into computer memory.

Data processing

The activity of a computer system using specific procedures that turn data into useful information for people.

Data refinement

The interaction or relationship between various data elements .

Data representation

The characters used to present data to the computer for processing in a language it understands.

Debugger

A system software program that identifies program errors.

Default mode

The editing mode in which the application software begins automatically.

Delete (Del)

A computer keyboard key that deletes the current character.

DELETE

A DBMS command used to remove a record from the database.

Desktop personal computer

A computer that fits on a desktop, is designed for a single user, and is affordable for an individual to buy for personal use.

Desktop publishing

Combined word processing and graphics application with advanced formatting capabilities.

Digital camera

A still-photograph camera that connects to a computer and transfers the image digitally to disk.

Digital computer

A computer that uses the binary arithmetic system as the basis for its operation.

Digital signal

A single discrete signal, a steady stream of pulses that does not change in tone, pitch, or volume.

Digitizer

An electronic drawing tablet used as an input device.

Direct access

A method to quickly retrieve data stored in a particular memory location with a specific address.

Also called random access. See sequential access.

Directory

A list of the files stored on a disk or a portion of a disk.

Disk operating system (DOS)

The operating system for a personal computer.

Disk pack

The device that holds a number of disks and is fitted onto a large system DASD.

Document

A self-contained work, created by a knowledge worker using a computer and an application program, that can be saved and later retrieved as a file.

Documentation.

The instruction that accompany a system or an application.

Dot-matrix

Output produced by printers that utilize moving wires in the print head.

Downloading

The data communication activity of receiving files. See uploading.

Draft

One of successive versions of a document.

Dumb terminal

A video monitor and keyboard connected to a large system that performs the simplest input and output operations, but no processing. See intelligent terminal.

Base of use

The term used to characterize aspects of computer system design; the way in which a person regardless of their computer knowledge, skills or background, can quickly become productive with the computer.

Electronic

A machine that uses components such as vacuum tubes, transistors, or silicon chips.

Electronic bulletin board

An interactive telecommunication service that permits posting and receiving electronic mail message; sometimes called a bulletin board system (BBS) or computerized bulletin board system (CBBS).

Electronic data interchange (EDI)

The use of communication network to transfer forms (such as invoices, purchase orders, shipping notices, and even payment) with computer.

Electronic funds transfer (EFT)

The use of communications network to perform financial and banking transaction.

Electronic mail

Creating sending, storing and forwarding written message (Files) to other knowledge workers.

Encryption

The use of coding devices at each end of the communication line to prevent transmissions from being intercepted and read by unauthorized people.

End

A computer keyboard key that may be used in conjunction with the cursor keys for moving through text.

End user computing

Giving knowledge workers their own computers so they can be more productive in their work.

Enter

A computer keyboard key used to complete and issue a command or instruction to the computer.

Entity

Data that has a particular meaning something about which data is to be collected in a database.

Ergonomics

The study of how to create safety, comfort, and ease of use for people who use machine such as computers.

Error checking

The process whereby networked computers ensure the accuracy and integrity of data transmission.

Escape (Esc)

A computer keyboard key that removes control of the computer system from the program in use either stopping a task in progress or exiting from the program altogether.

Executive information system (EIS)

A system for top management that utilizes a PC with brilliant color graphics and extremely user-friendly software that can present data easily.

Expansion slot

A type of interface connection for printed circuit board peripherals in the personal computer.

Facsimile

A type of source data input; either a standalone machine or a printed circuit board peripheral in the personal computer.

Field

A group of characters that represent an attribute.

File

A group of related records and the primary unit of data storage.

Filename

A unique designation for a file created with an application. In DOS, it is up to eight characters long, followed by an optional period or dot and three-character filename extension.

Floppy

A magnetic disk used for auxiliary storage.

Footer

Information about the document that appears at the bottom of the page, in most cases repetitively throughout a document such as the page number. See header.

Formatting

The process of emphasizing and arranging text on the screen or the printed page.

Fortran

A programming language.

Frame

A box in desktop publishing that contains text or graphics.

Front end

A tool that allows knowledge workers to work flexibly with a database. It may assist in access to data, analysis, and creating custom database and database applications.

Function

A formula or set of formulas that have already been created and programmed into the spreadsheet for use.

Function key (F-key)

A computer keyboard key used in conjunction with standard keyboard keys to issues commands or instruction to the application software.

Gas plasma display

A deep orange, flat panel display composed of three sheets of glass with plasma an illuminant gas between them.

General purpose computer

One that is used for a variety of tasks without the need to modify or change it as the tasks change.

See special purpose computer.

Geographic information system (GIS)

An image database that combines computer graphics- generated maps and cartography with relevant data in a database.

Gigabyte

One billion bytes or 1 GB.

Graphics

Pictorial representation of numeric data produced by the spreadsheet, also a standalone application.

Hacker

Someone with great skill in programming and working with computers.

Handshaking

Synchronizing two communicating computers for data exchange.

Hard copy

Output on paper, from a printer or plotter. See soft copy.

Hard disk drive

An auxiliary storage device with a rigid magnetic disk enclosed in a permanently sealed housing.

Hardware

The components or physical devices that make up a computer system.

Header

Information about the document that appears at the top of the page see footer.

Help

A function built into the application that contains instruction, tips, pointers, explanation, and guidance.

Hertz (Hz)

A unit of measure for machine cycle frequency. One hertz equals one cycle. Also used to gauge the speed of personal computers measured in millions.

High-level language

A method of writing programs using English-like words as instruction.

Home

A computer keyboard key that is used (often in conjunction with the cursor control keys) for moving through text.

Host

The computer keyboard key that is used (often in conjunction with the cursor control keys) for moving through text.

Hypertext

Software that dynamically associates words and concepts so that searching for a specific word also produces other related words or text.

IO

The process of input and output also the devices or peripherals used for input and output.

Icon

A pictorial figure or representation that is designed to be easily recognizable by most people.

Icon bar

A menu of icons running across the top or bottom of the screen.

Impact printer

A printer that strikes characters on the paper. See nonimpact printer.

Import

To bring a file created by another type or band of application into the one currently in use.

Index

A DBMS command that puts data in either alphabetical or numerical order.

Indexing

The process by which the read-write head moves to the outer edge of the disk to find data in its various location.

Information engineering

A software development methodology that brings knowledge workers, management and information systems personnel together into a working partnership.

Information services

On-line services that maintain and provide access to data repositories.

Information utility

An on-line service that combines information and interactive services to provide access to news, extensive databases, bulletin boards, shopping services, and so on.

Inkjet printing

A printing technique where characters and images are transferred to paper by spraying a fine jet of ink.

Input devices

Components used for entering data or instruction into the computer.

Insert (Ins)

A computer key that toggles between the two modes for entering text. See type over mode.

Instruction cycle

The portion of the machine cycle in which the CPU fetches (retrieves) an instruction from RAM and gets ready to perform processing.

Instruction register

A register that holds an instruction (for example, add, multiply, or a logical comparison operation).

Integrated circuit

An electronic component with hundreds or thousands of electronic circuits on a single piece of silicon.

Integrated service digital network (ISDN)

An all-digital network that connects computers directly to one another no modem is necessary.

Intelligent terminal

A terminal with its own CPU or processing capabilities built in . See dumb terminal.

Interface

The point where a peripheral device, software, or a human meets the computer.

Internal modem

A modem mounted on a printed circuit board that fits into an expansion slot inside a personal computer.

Interpreter

Software that translates source code one line at a time for immediate execution by the CPU.

Joystick

A pointing device most commonly used for playing computer games.

Justification

A ligning text against the left, right, or both margin.

Keyword

An input device used to enter data or instructions.

Kilobyte

One thousand bytes or 1KB.

Label

Text in a spreadsheet.

Landscape

Laying the sheet of paper on its side so it measures 11X8 $\frac{1}{2}$ inches.Sec portrait.

Laptop

A portable computer weighing between 8 and 15 pounds with a desktop-quality keyboard.

Laser printer

A printer that creates output by directing a laser beam onto a drum creating an electrical charge that forms a pattern of letter or images and transferring them to paper.

Ledger sheet

A sheet of columnar paper with columns and rows, used for accounting and calculating.

Letter quality printer

A printer similar to a typewriter that creates high quality impact printing.

Light pen

An input device used to draw write, or issue commands when it touches the specially designed video monitor screen.

Line spacing

The amount of space between lines of text, for example, single space, double space etc.

Liquid crystal display (LCD)

A type of flat screen display commonly used with laptops.

Load

To read software into the computer.

Local area network (LAN)

A network that allows a small group of knowledge workers in the same geographic location to share data, programs and hardware resource. See star network, bus network, and ring network.

Machine language

A programming language.

Magnetic ink character recognition (MICR)

A type of source-data input that allows the computer to recognize character printed using magnetic ink.

Mail merge

Combining information from separate files (such as a name and address) to create special document.

Mainframe

A large, general-purpose computer capable of performing many tasks simultaneously for hundreds or thousands of people.

Main memory

The storage area directly controlled by the computer's CPU. Also called random access memory (RAM).

Management information systems (MIS)

The computer system working together with the business organization, to achieve the business goals. It includes human input, processing resources, and products or services output.

Margin

The blank space on the sides or top and bottom of the text.

Media

The physical material used to store data and instruction.

Megabyte

One million bytes, or 1 MB.

Memory management

The process of controlling the quantity of data and instruction that can be held in RAM at any given time.

Menu line

The area on the screen that displays the various options you have for working with a document.

Millions of instruction per second (MIPS)

The measure of CPU speed in mainframes and minicomputers.

Minicomputer

A versatile, medium-sized computer that can be used by more than one person at the same time

Minifloppy

A $5\frac{1}{4}$ inch magnetic disk..

Mnemonic

A term or word that is easy to identify, such as ADD for addition.

Modem (modulator-demodulator)

A peripheral device that allows computers to communicate via telephone lines.

Monitor

A video display that presents computer work.

Motherboard

The component where a computer's primary electronic circuitry resides.

Mouse

A hand-held device moved across the desktop surface to electronically move the pointer correspondingly across the screen.

Multimedia

An interactive application that lets the knowledge workers and the computer engage in an ongoing exchange or presentation of information.

Multiprogramming

Term commonly used to refer to multitasking on mainframes and minicomputers.

Multitasking

An operating system function that permits using more than one application at the same time. See task-switching.

Multiuser

An operating system able to process the work of two or more users, working at different terminals or personal computer, at the same time.

Navigation

The ability to move from one point in the database to another.

Network

Any computer system that connects two points or more in a communication channel.

Network database

A DBMS that utilizes many-to many relationship.

Node

A point in a communication channel.

Nonimpact printer

A printer that forms a character by means other than striking the paper, most commonly by using laser or inkjet technology. See impact printer.

Nonvolatile

A type of memory in which instruction and data are retained regardless of whether the computer is turned on or off.

Number lock (Num Lock)

The computer keyboard key that locks the numeric keypad into its numbers mode.

Numeric keypad

The set of number and mathematical operations key to the right of the **QWERTY** keypad.

On-line

Two computers in direct telecommunication with each other.

On-line processing

A type of computer processing in which data is processed immediately, as soon as it is input.

Open system interconnect (OSI)

A standard that separates computer –to- computer communication into seven layers or levels

Operating platform.

The computer operating system networking system, application and services, and development languages and tools.

Operation

A set of instructions or a programming statement; with a supercomputer, termed a floating point operation.

Optical character recognition (OCR)

A specific typeface developed specifically to be read by early scanners

Optical disc

Storage media that is read or written to using a laser beam.

Outliner

A word processing feature that creates an outline and paragraph numbering for a document.

Output

The product or result of the computer's data processing.

Output devices

Devices used to see the results of data processing.

Page break

The last line of text at the bottom of a particular page.

Page down

A computer keyboard key that may be used in conjunction with the cursor control keys for moving through text.

Password

A special character string unique to the individual that allows the computer to differentiate between authorized users and intruders.

Peer-to-peer

A network architecture where every computer on the network is an equal and can act as a server, a workstation, or both.

Peripheral device

A device connected to the computer, may be input, output, or storage.

Personal computer

A computer designed for use by a single individual and priced so that the average person can afford it. Usually small enough to fit on a desktop sometimes called a microcomputer.

Personal information manager (PIM)

A DBMS that combines other desktop tools (such as the appointment calendar, calculator and to do list) and word processing.

Plotter

A type of printer that uses inkjet technology to create scientific and engineering drawings as well as other graphics, often in color.

Pointer

The arrow or character moved across the screen by the mouse.

Pointing devices

Peripheral used to move the cursor, usually working in conjunction with the a keyboard.

Point-of-sale (POS) terminal

A source data input device that scans the bar codes of the UPC to register the price (which is programmed into the host computer) as well as to deduct the item from inventory.

Port

Connections at the rear of the motherboard for peripherals such as the keyboard, monitor, and printer.

Portable

A personal computer used by a single individual that can be used in many different places.

Portrait

A piece of paper oriented $8\frac{1}{2}$ by 1 inches. See landscape.

Power user

A knowledge worker who understands the business and work group objective as well as the computer system in use. (specifically personal computers), strategies for getting the most productivity from computers for the work group.

Presentation graphics

Computer graphics or visuals for business that present numerical statistical, financial, or other quantitative data in a pie chart, a bar chart, a line graph or a scatter graph.

Printer

A device that displays the results of computer work.

Printing

The final step in working with an application and document that create hard copy.

Processing

See data processing.

Program

A series or set of instruction that give us a more complex result from the computer.

Program disk

The disk on which the application instruction are stored.

Programmer

A person who understands the problem or task the computer is supposed to work on and can translate it into the language the computer understands

Programming

The activity of programmers.

Project

A character or message that indicates the computer system is ready to accept a command or input.

Punched card

The earliest input media. A stiff cardboard card with holes punched into it, used to feed instruction or data into a computer.

Query

A software tool or a function that extracts data from the database and presents it in a usable format.

Query language

A type of programming language that allows knowledge workers to make DBMS inquiries without using programming codes or keywords.

Random access memory (RAM)

One of the three components of the central processing unit. It provides temporary storage for the programs being executed and for data as it passes through processing. Also called main memory.

Rapid application development (RAD)

An information engineering technique designed to take maximum advantage of the integrated CASE (I-CASE) tools.

Read

To copy data from disk to memory.

Read only memory (ROM)

Memory chips that store permanent instruction cannot be changed.

Read/write head

The element in the data storage device that scans the magnetic surface of the disk. Reading the disk is searching for data or instruction, writing to disk is storing data or instruction.

Record

A collection of related data items or fields that a DBMS treats as a unit.

Reduced-instruction set computing (RISC)

A microprocessor or CPU architecture that uses a condensed set of instructions for its operating system. See complex-instructions set computing.

Register

A temporary storage area designed to hold instruction and data during processing.

Relational database (RDBMS)

A DBMS in which all data is viewed as essentially alike therefore it creates any to any relationships.

Ring network

A network in which individual computers are connected serially to one another.

Row

The cells running horizontally across a spreadsheet screen.

Ruler

A tool for measuring the size of frames and columns in desktop publishing.

Saving

Storing

Storing a document or file on disk.

Scanner

An input device that uses a light sensitive device to enter text (and depending on the software graphics) into the computer.

Scheduling

The operating system's ability to make maximum use of the CPU by performing tasks in a precise sequence.

Scrolling

A word processing function that continuously feeds an electronic sheet of paper for entering work.

Scrolling bars

Bars on the side and bottom of the screen that permit using the mouse pointer to move through text.

Sequential access

The method of storing data in a particular order, such as alphabetically or by date and time see direct access.

Serial interface

An interface where the data passes through the interface sequentially see parallel interface.

Server

The back end computer in a client needs to process. Also called a file server.

Simple management protocol (SMP)

A set of network standards that make it possible to interconnect many types of computer systems.

Soft copy

The output produced by the video monitor. See hard copy.

Software engineering

The aspect of computer system development that involves the design, development, and implementation of production software system to large scale business computers.

Sort

A DBMS command to order or separate one or more records in a database.

Sort keys

The fields used by the SORT command to separate records.

Source code

The program written in a specific programming language, that will be sent to the computer for processing.

Source data input

Feeding data directly into the computer without human intervention. See magnetic ink character recognition, magnetic strip and data collection device.

Special-purpose computer

A computer designed and used solely for one application. See general-purpose computer.

Spreadsheet

An application that uses mathematical formulas to perform calculation on data arranged in a matrix or grid. Often used in accounting.

Stand alone program

An individual application that works alone.

Standards

The rules and guidelines for achieving satisfactory performance and communication between different network and computer systems.

Start network

A network that provides access to central files and system resources through a host CPU.

Statement

An expression or instruction in a programming language.

Storage

Holding data in computer memory.

Storage register

A register that holds data retrieved from RAM temporarily, prior to processing.

Structured coding

Guidelines for programming in system development.

Structured query language (SQL)

A popular query language for DBMSs. See query language .

Structured techniques

An orderly way of programming that can be understood by others as well as the original programmer.

Supercomputer

A special type of computer that is commonly used to perform a single, very complex task that requires massive processing power.

Syntax

The set of rules governing the language's structure and statement.

System analyst

The study of an activity, procedure, or an entire business to determine what kind of computer system would make it more efficient.

System software

Software that controls the computer's primary operation such as the operating system.

System unit

The cabinet in which the computer's electronic and mechanical components are stored.

Template

A worksheet with labels commands, and formulas already created and saved in a file.

Terminal

A keyboard and monitor connected to a mainframe or minicomputer.

Text editor

A program with which to write, erase, and manipulate words on the monitor screen, similar to a word processor, but without many of the formatting features.

Thermal printer

A printer that uses heat to form a nonimpact image on chemically treated paper.

Time sharing

A computer system that can be used by many people simultaneously for different purposes or application.

Toggle

A function of a specific computer keyboard key that alternates between two related tasks.

Topology

The layout of computer and other devices as well as their connections.

Touch sensitive screen

An input device that permits using the finger as the input devices

Trackball

A pointing device that acts like an upside down mouse to move the cursor on the screen.

Twisted pair

Two copper wires that create a communication channel. Commonly used as phone lines.

Type over mode

The insert key toggle that deletes each old character as you type a new character; see insert. Also called overstrike mode.

Underline

Highlighting text by drawing a line under words.

UNIX

A popular operating system.

Uploading

In telecommunications, the process of sending files from a remote computer to a large central computer to a large central computer. See downloading.

Utility software

A type of software that performs a variety of helpful tasks with the ease and efficiency of an application program.

Virtual memory

A portion of hard disk space that the CPU regards in the same way it does RAM so that RAM appears in essence to have more capacity than it actually does.

Voice mail

The use of the computer to capture (input), digitize (process), store on disk and forward (output) spoken-word message.

Voice output

Spoken output produced by a computer. Also called speech synthesis.

Voice recognition

Entering data into a computer by speaking into a microphone. Also called voice input.

Volatile

A type of memory in which the contents are removed when replaced by new instructions and data, or lost when electrical power to the computer is turned off.

Volatile memory

Short-term memory. Everything stored is lost when the computer's power is shut off.

Wide area network

A type of private network that uses phone lines, microwave relaying station, and satellites to connect computers located miles apart.

Windows

Individual boxes in which separate applications are displayed on the monitors.

Word

A logical unit of information word length is the term used to describe their size, counted in numbers of bits.

Word processing

An application that permits creating and revising written work.

Word wrap

A word processing feature that automatically moves a word from the end of one line to the beginning of the next.

Work area

The blank area of the screen that accepts text.

Work group

A number of knowledge workers, each of whom has different job duties or tasks, but all of whom are working towards a common goal.

Working copy

A duplicate copy of program disk used for everyday work. The original is stored for safekeeping.

Work session

The period of time during which a knowledge worker is computing.

Worksheet

The data document created by the spreadsheet, program, containing the words, values, formulas, and so on.

Workstation

A powerful desktop computer most commonly used by a single individual, but which may be shared by others.

Write

To copy data from memory to disk.

Write once read many (WORM)

An optical disc storage media that allows the knowledge worker to store data once on the disc and then re-use it many times.

Writing

The process of conveying information with words.