ELECTRONIC SPREADSHEETS 1

Introduction to spreadsheets

A spreadsheet essentially a ledger sheet that lets you enter, edit and manipulate numeric data.

There are two types of spread sheet;

The manual spread sheet.

The electronic spread sheets

A manual spread sheets. is the type of spread sheet that is used my bookkeeper as ledger with many sheets of papers divided into rows and columns on which various amounts are entered manually using a pen or pencil?

An electronic spread sheet on the other hand is prepared using a computer program that enables a user to enter values in rows and columns similar to the one's manual spread sheet to manipulate them mathematically using formulae.

COMMON WORDS USED IN SPREAD SHEETS

A work sheet is a grid of columns (indicated by letters) and rows (indicated by numbers).

A work book is a collection of work sheets

The letters and numbers of the columns and row (called labels) are displaced in gray buttons across the top and left side of the work sheet.

A row is the horizontal arrangement of cells from the left to the right of the work sheet.

A column is the vertical arrangement of cells from top to bottom.

A cell is the intersection of a column and a row.

A cell address that's the column letter and the row number, e.g. A11 cells can contain text, numbers or mathematical formulas.

Formula. It's a mathematical equation that will calculate results. Examples of a simple formula = A3- C6/D2 or = (B2+ B8)

Function: a function is preset formula. A formula in excel begins with an equal sign (=) followed by the functions name and its arguments. The function name tells excel what calculation to perform. for example, the SUM function is written as: = SUM (B2:B8).

EXAMPLES OF SPREADSHEET SOFTWARE.

GENENAL

VisiCalc; this was the first type of spreadsheet to be developed for personal computers

- Lotus 1-2-3. This is an integrated software with spreadsheet for module
- Microsoft excels
- VP – Planner etc.
- Open office calc
- Lotus improves
- Editor
- Google sheets
- Think free online Calc

Jot spot tracker

EXCEL FORMULA ERRORS – understand and debug each error

There are a variety of error that occur when using spreadsheet and once they occur some of them are annoying and others make learner get disgusted with the operation of spreadsheet.

1 #DIV/O! Formula error

This is an error that occur when a formula is attempting to divide by zero. When you divide something with zero you see this error for example. A cell with the formula = 23/0 would turn in this error.

How to fix #DIV/0 error?

Simple, do not divide the value by zero. You know the answer anyway.

2 # NAME? Formula error

This is an error that occur when the formula is invalid or incorrect. I.e. misspelled formula or named range. For example, if you write =SUMMA (a1: a10) in a cell, it would return # NAME? Error.

How to fix #NAME? Error?

- Make sure you have mentioned the correct formula name. If you are using excel 2007, when you are typing the formula excel shows all the matched formulas.
- Make sure any user defined functions you are using are properly installed.
- Double check the ranges and string parameters in your formulas.

3. #N/A Formula Error

Most commonly means no value is available or inappropriate arguments have been used. The N/A error is shown some data is missing, or inappropriate arguments are passed to the lookup functions (VLOOKUP, hookup etc.) of if the list is not stored and you are trying to lookup using sort option

How to fix #N/A error?

Make sure you wrap the lookup functions with the same error handling the mechanism. For example if you are not sure the value you are looking is available, you can write something like =if (is error (VLOOKUP (…)), "not found "VLOOKUP (…)).This will print "not found" the VLOOKUP returns any error (including #N/A)

4. #NULL! FORMULA ERROR

This is a rare error. When you use incorrect range operators often you get this error for example the formula =SUM (D30:D32 C31:C33) returns a #NULL! Error because there is no separator between range one and two.

How to fix #NULL! ERROR?

Make sure you have mentioned the ranges properly

5. #NUM! FORMULA ERROR

This is number error that you see when your formula returns a value bigger than what excel can represent. You will also get this error if you are using iterative function like IRR and the function cannot find any results. For example, the formula =4389^7E+37 returns a # NUM Error.

How to fix a #NUM! ERROR?

Sample, make your number smaller or provide right starting values to your iterative formula.

6. #REF! FORMULA ERROR

Error that occur when excel cannot locate the referenced cell. You get #REF! Error when one of the formula parameters is pointing to an invalid range. This can happen because you deleted the cells. For example, try to write a sum formula like =SUM (A1:A10, B1:B10, C1:C10) and then delete the column immediately the sum formula returns #REF! Error? First press ctrl+Z and undo the actions you have performed. And then re-think if there is another way to re write the formula or perform the action (deleting cells).

7. #VALUE! FORMULA ERROR

This is an error that occur when there are wrong arguments. Value error is shown when you use text parameters to a function that accepts numbers for example the formula =SUM ("abs ","cd ") returns #VALUE! Error.

How to fix the #VALUE! Error?

Make sure your formula parameters have corrected data types. If your using functions that work on numbers (like SUM, sum product etc.) then the parameters should be numbers.

8. ######error

This is because the column is not wide enough to display values. You see a cell full of # symbols when the content cannot fit in the cell for example a long number like 2339432094394 entered in a small cell will show ###s.

How to fix the ######error?

Simple, adjust the column width. And if the error is due to negative dates, make them positive.

FEATURES OF SPREADSHEET SOFTWARE

GENERAL:

- Cell formatting-cells may be formatted specifying font, font color, style, size etc.
- Multiple work sheets- Provides many sheets within the workbook
- Searching and sorting. Provides ability to search for any phrase, text, number.
- Importing and exporting – Spreadsheet maybe emailed as an attachment from within spreadsheet application.
- Formulas
- Functions (indicating all java script functions)
- Custom functions /macros (using pure java script)
- Charts: line graphs, bar graphs, pie graphs, line step graphs, scatter graphs
- Cell formatting (using full CSS)
- Cell formats (numbers, strings, Currencies, dates, times)
- Cell merging (rows and columns)
- Cell locking
- Cut /copy/paste with single cells or ranges of cells
- Custom column groups
- Custom names for columns and rows
- Custom styles for columns, rows and column groups
- Integration of images from the web
- Operations like deleting and inserting columns /rows
- Java script as common data format

TOPIC 8
INTERNET AND WORLD WIDE WEB

THE INTERNET

The internet, sometimes called simple "the net "is a worldwide system of a computer networks – a network of networks in which users at any one computer can, if they have permission, get information from any other computer (and sometimes talk directly to users at other computers). The internet is a worldwide collection of networks linked together.

Definition: internet is the global interconnection of computer network that use standard internet protocol (IP/ICP)

It's the global interconnection of computers to share information and data. Or internet is the network of networks.

Intranet

A network of networks within an organization used to share company resources and information amongst employee and departments.

Extranet

Is an extended corporate network that uses WWW technology to facilitate communication with company customers, suppliers, or relevant government department?

Requirements for internet access

You should have the following to effectively use the services of internet:

1 NIC Network Interface card: enables the computer to connect and be able to communicate.

2. Internet Service Provider (IPS): IS a company that supplies connections to the internet, usually for a monthly fee. The internet service providers in Uganda include:

- Africell Uganda Limited
- MTN Uganda Limited
- Swift global Uganda ltd
- Smile telecom
- Smart talk
- Uganda on line communications
- Uganda telecom ltd

Services offered by ISPs

Internet access. To connect individual or companies on the internet in order to enjoy internet services.

Providing internet related solution: IPS ensures that the users have constant services therefore they help in diagnosing network challenges.

Domain name registration: this refers to the processing of registering a domain names which identifies one or more IP address with a name that is easier to remember and use URLs to identify particular web pages.

Domain hosting: they help to host individuals and companies web websites.

Types of internet connections.

The different methods of connections include;

a) **Dial – up connection**: dial – up connection requires users to link their phones line to a computer in order to access the internet. This particular type of connection does not permit users to make or receive phone calls through their home phone service while using the internet.
b) **Broadband connection:** this is a high-speed connection provided though either cable or telephone companies. It uses multiple data channels to send large quantities of the information. The broadband is shorted for band width.
c) **Digital subscriber line (DSL) connection**: this uses existing two wire copper telephone line connected to one's home so service is delivered at the same times as land line telephone service.
d) **Mobile connection:** this uses mobile broadband technology also called wireless wide area network (WWAN). Technology to provide wireless high-speed internet access through portable devices.
e) **Wireless connection**: they use radio frequency bands instead of telephones or capable networks. Wireless connection is made possible through the use of a modem, which picks internet signals and sends them to other devices.
f) **Satellite connection**: is used as an option in a certain area where broadband connection is not yet offered. Similar to wireless access, satellite connection utilizes a modem.
g) **ISDN connection**. ISDN (integrated service Digital Network) Allows users to send data, voice and video content over digital telephone lines or standard telephone wires. This installation of ISDN adapter is required at both ends of the transmission on the part of the user as well as the internet access provider.

3. A computer or any other device that a user will manipulate to use the service of internet.

4. Telephone lines or points

5. Network operating system: Require to configure the machine to accept all standards of using the internet by itself and other computers connected.

6. Modem: Used to convert incoming signals into acceptable format of the computer use.

7. Browser: Used to access pages on the internet. Examples include – internet explorer, Mozilla fire fox, Netscape, navigator etc.

8. Other devices include; routers, radio receivers, etc.

Services of the internet (Uses of computer communication)

The World Wide Web is one of the most popular services available on the internet. Other widely used Internet services include e-mail FT, newsgroups, message boards, mailing lists, chat rooms, instant messaging, internet telephony and videoconferencing.

1 E-mail: is a transmission of messages via a computer network such as local area network or the internet.

2 FTP (FILE TRANSFER PROTOCOL): Is an internet standard that allows users to upload and download files with other computers.

3. News groups: also called discussion group, is an online area where users conduct written discussions about practical subjects.

4 Message boarders: or discussion boarders is a web-based type of discussion group that does not require a news reader program.

5. Mailing lists: is a group of e-mail names and address given a single name. When a message is sent to a mailing list, every person on the list will receive a copy of the message.

6. Chat rooms: is a location on internet server that permits users to chat with each other by typing lines of texts on the computer.

7. Instant messaging: is a real-time communications services that notifies a user when on one or more people are online and then allows the user to exchange messages or files with them.

8. Internet telephony: sometimes called voice over IP (VoIP), Is a web-based telephone service that allows a user to talk to others for just the cost of the internet connection.

9. Blogs: it is a discussion site published on a world wide web and consisting of discrete entries ("POSTS") typically displayed in a reverse chronological order the most recent appears first.

10 video conferencing: Is a virtual meeting between two or more people geographically separated people in real time who uses a network or the internet to transmit audio and video data. A video conference conducted over the internet, using Web browsers and Web servers to deliver the services, is called a **web conference.**

A video conferencing has the following advantages

- It avoids participants having the spend time travelling to meet each other
- Saves travel / transport costs
- The participant in different locations are able to work on the same electronic document
- Seeing a person, you a communicating with visual clues that are not available during telephone conversations
- It can be used to allow experts to investigate a problem without making a site visit for example the engineer could view components that have failed so that the correct replacement parts can be supplied

Disadvantages of video conferencing

- A high band width communication link is required to transmit and receive high quality images
- There is a short time lag between speaking and receiving a response that disrupt the natural flow of conversation
- High quality detected video conferencing system are expensive to buy
- It leads to loss of face to face interaction among works

11.**Telecommuting:** It is a work arrangement so that employees may work away from the standard work place of the company, but communicate with the office using some kinds of communication technology

Advantages of telecommuting

- Reduces the time and expense for the travelling to and from work
- Eliminates travelling over unsafe weather condition
- Allows flexible work scheduled for employees
- Provides a convenient, comfortable work environment for disabled employees or those recovering from injuries or illness
- Reduces air pollution caused by vehicles driven to and from work

Disadvantages of telecommuting

- Reduced human face to face interactions among working staff
- Works has to stop if any component of communications systems fails to work
- Leisure time at home may be replaced by work
- Data security may be jeopardized

12 Global Positioning System (GPS): consists of one or more earth-based receiver that accepts and analyze signals sent by satellites in order to determine the receivers` geographical location

Uses of GPS

- ✓ To locate a person or an object
- ✓ Ascertain the best route between two points
- ✓ Monitor the movement of a person or object
- ✓ Create map
- ✓ Many cars and ships also use GPS to provide direction a destination and weather information

13 **wikis**: is a website which allows its users to add, modify or delete its content using a web browser usually with a help of a simplified markup language or rich - text editor. Wikis are powered by wiki software. most are created collaboratively.

14 **BBS:** a bulletin broad system (BBS) is a computer that maintains a centralized collection of electronic messages

15 **Fax**: A facsimile (fax) machine is a device that transmits and receives documents sent or received via a fax machine are known as faxes. Fax capacity can be added to the computer using a fax modem

Advantages of fax

Hard copies are available

Disadvantages of fax

Sending a big document can be slow

Wastage of papers when junk faxes are sent

Uses of the internet

Companies, individuals, and institutions uses the internet in many ways

1. Companies use the internet for electronic commerce, also called e commerce, including advertising, selling, buying, distributing products and providing customer service
2. In addition, companies use the internet for business to business transaction, such as exchanging financial information and accessing complex data base
3. Businesses and institutions use the internet for voice and video conferencing and other forms of communications that enables people to telecommute (work away from the office using a computer)

4. The use of electronic mail (e-mail) speeds communication between companies, among co-workers, and among other individuals.
5. Media and entertainment companies use the internet for online use and weather services and to broadcast audio and video, including live audio and television programs
6. Online chat allows people to carry on discussions using written texts.
7. Instant messaging enables people to exchange messages in real time
8. Scientists and scholars use the internet to communicate with colleagues, perform research, distribute lecture notes and course materials to students and publish papers
9. Individuals use the internet for communication, entertainment, finding information and buying and selling goods and services

Advantages of using internet

People have different reasons for connecting to the internet, which include;

1. It allows access to wealth information, such as news, weather reports and airline schedules. It provides information at various levels of study. Everything from scholarly articles to ones directed at children. It provides information on almost every subject imaginable for example, history of a chair
2. It enables one to download files, listen to music and watches movies free of charge
3. Easy access to source of entertainment and leisure such as online games, magazines and vacations planning guides
4. It has powerful search engines that enable users locate specific data in a short time
5. It provides the ability for a user to do research from your home versus research libraries
6. It provides messages broad where people can discuss ideas on any topic. Ability to get wide range of opinions. People can find others that have similar interests in whatever they are interested in.
7. The internet provides the ability of e-mail. free mail services to anyone in the country. therefore, communication is made simple and cheaper for a user. platform for product like SKYPE, which are allows for holding a video conference with anyone in the world who has access.
8. Friendships and love connections have been made over the internet by people involved in love / passion over similar interests
9. It enables one to shop for goods and services online i.e. e- commerce .one can buy a car from japan without necessarily travelling. electronic commerce (e-commerce) is financial business transactions that occurs over an electronic network, such as the internet. Online shopping and banking are two popular types of e-commerce that uses either electronic money (e-money) or electric data interchange (EDI)

- ✓ E-money is a means of paying for goods and services over the internet
- ✓ EDI is a set of standards that control the transfer of business data and information among computers both within and among companies

Advantages of e-commerce include

a) Transactions can occur instantaneously and globally, thus save time for participants on both ends
b) Transactions can occur 24hours per day
c) Businesses have access to millions of people with internet connections
d) Businesses have the ability to gather customer information, analyze it, and react if appropriate
e) Information can be changed and be available quickly
f) Customers can compare prices easily
g) Feedback can be immediate
h) Manufacturers can buy and sell directly, avoiding the cost of the middleman
i) Distribution cost for information is reduced or eliminated

Disadvantages of using the internet

1. There is a lot of wrong information in the internet. Anyone can post anything and much of it is garbage
2. There are predators that hang out on the internet waiting to get unsuspecting people in dangerous situations
3. Some people are getting addicted to the internet and thus causing problems with their interactions of friends and loved ones
4. Pornography can get in the hands of young children to easily
5. Easy to waste a lot of time on the internet. you can start surfing, and then realize far more time has passed than you realized. internet and television together of added to the more sedentary life styles of people which further exacerbate the obesity problem
6. Internet has a lot of "cheater" sites. People can buy essays and pass them off as their own far more easily they used to be able to do
7. There a lot of unscrupulous businesses that have sprung up on the internet to take advantage of people
8. Hackers can create viruses that can get into your person computer and ruin valuable data
9. Hackers can use the internet for identity theft
10. It can quite depressing to be on the internet and realize just how uneducated so many people have become in today`s society

Internet Terminologies

URL:it stands for universal Resource Locater, are web browser addresses of internet pages and files. A URL works together with IP addresses to help us name, locate and bookmarks specific pages and files for our web browsers

Hypertext. On web pages is any text that is "clickable".HTML

Hypertext Markup Language. The language used for the web pages.

Domain name: This is the name that identifies the website. For example, Microsoft.com is the domain name of Microsoft website

Home page: This is the first page you see on the website, it acts like a title page of a book, the home page or welcome page identifies the website and contains links to other pages of the site

Web publishing

This when designed pages (documents of html nature acquire space on the www server to be shared by other people on the net

Hyperlink

It is part of the text or graphic in the web page, that when clicked at will automatically do the following:

a. Take you to a different part of the same page within the website
b. Take you to a page in a different website
c. Enable you to download a file
d. Launch an application, video or sound

Browsing. The term used to mean searching a particular/specific item

Surfing. Means moving from one website to another for topics of interest, the term surf is generally used to describe a rather undirected type of web designing.

Mosaic. Was the first graphical browser for the web

It was designed by Marc Andreessen who worked at the National Center of supercomputing Applications, before leaving to form Netscape

Package switching. Package switching is for dividing electronic messages into packets for transmission over a network to their destination through the convenient route

Attachment. Any file that accompanies an e-mail message.

Download. The process of transferring the copy of an electronic file from a remote computer to the requesting computer by means of a modem or network.

Uploading. the process of loading any data [text, audio, video] online

Handle. Is another word for a user name.it can refer to the name you see in chat rooms, web forums, and social media services like Twitter …? When online chat became popular in the 1990s, the term "handle" transferred to the internet and became a common way for users to identify themselves online.

THE WORLD WIDE WEB

The World Wide Web: (commonly shortened to The Web) is a system of interlinked, hypertext documents accessed via the internet using a web browser. The WWW emerged in the early 1990s, but has grown fast to become the most widely used service on the internet

A Web Page is an individual page that contains texts, graphics, animations, audio, and video (i.e. multimedia elements), as well as built in connections, called hyperlinks, to other documents

A Web Site is a collection of related Web pages. A home page is the starting page or a table of contents for a website, and normally has a name called index.htm or index.html

A Web Browser is a software program used to access and view Web pages

Example of web browsers include

a) Internet explorer
b) Mozilla Firefox
c) Opera
d) Safari
e) Google chrome
f) Conqueror
g) Arora
h) Dillon
i) k-melon
j) lynx
k) lobo
l) Kazakhs
m) Amaya
n) Net positive
o) QNX Voyage
p) Planet web
q) Netscape
r) lunarscape
s) flock

Each Web page has a unique address, called a Universal Resource Locater (URL), which tells the browser where to locate the document. A URL consists

of a protocol, a domain name, and sometimes the path to a specific web page or location on a web page

Types of websites

1. **Blog (web log):** sites generally used to post online diaries which may include discussion forums e.g. blogger, Xanga. Many bloggers use blogs like an editorial section of a newspaper to express their ideas on anything ranging from politics to religion to video games to parenting, along with anything
2. **Brand building site:** A site with the purpose of creating an experience of a brand online. This sites usually do not sell anything, but focus on building the brand. Brand building sites are most common for low-value, high-volume fast-moving consumer goods (FMCG).
3. **Celebrity website:** A web site whose information revolves around a celebrity. These sites can be officially (endorsed by the celebrity) or fan made (run by his or her fan, fans without implicit endorsement).
4. **Community site:** A site where people with similar interests communicate with each other, usually by chat or message boards.
5. **Content site:** Sites whose business is the creation and distribution of original content.
6. **Corporate website:** Used to provide back ground information about a business, organization, or service.
7. **E-commerce website;** e-commerce websites take brochure websites a step further by allowing you to shop directly from your computer. The main difference between the brochure site and an e-commerce site is that the latter features a checkout system to enable you to order directly from the online store
8. **Personal websites;** these are similar to a personal blog where an individual in all likely hood will have their personal domain. These are created by friends and families to share information and pictures online with each other allowing people to keep in contact.
9. **Social media and networking websites;** This are now more popular than ever, online forums and social networking sites like Facebook and My Space are used on a daily basis to spread the work about businesses and keep in touch with family and friends. Examples of social networking sites are Facebook, twitter, Instagram and others.

A Web Browser

Is a software that helps a computer user gain access to all the content that is on the internet and the hard disk of the computer. It can view images, text documents, audio and video files, games etc.

Types of web domains

.com. This is the most common domain which is commonly refers to a business or commercial Web site. Many companies, stores and products use this as their domain. These Websites can provide information about the companies, people or products.

. Edu. If the domain is. Edu, the website usually belongs to the place of education, like a university or a college.

.gov. The domain .gov refer to a government owned web site. It could be for your country, state or a government-sponsored organization

.net. Domain name used for internet administrative sites.

.mil. Domain name for military sites

.org. Domain for organization

.aero. Domain for airport industry

. job: Employment related sites

. tell: Services that involve connections between telephone networks and the internet

UNDERSTANG URL AND DOMAIN NAMES

Is a domain name the same as a URL?

This is a URL (Uniform Resource Locator): http://www.example.com/

The "domain name." portion of that UR is: www.example.com

A URL always includes a protocol like:

http://

ftp://

First, we have the protocol: http://www.example.com

When it comes to website, all that really matters is whether the protocol is https (secure connection) http (non-secure connection)

Server

This page is on the www.extension.org server.

The server's name has three sections: hostname, subdomain and domain.

Hostname

The hostname is the name of the individual server. This page is on the "www" host. Often a company may have several hosts for different sites for example extension has "people.extension.org) and (blogs.extentio.org)

Subdomain

A subdomain is a subdivision of the main domain name. The subdomain is usually the name of the organization providing the internet connection and is located before top-level domain

Top-level domain

The portion of the server's name after the last dot is top-level domain

Domain organization types

- Edu -Education institutions
- com-Commercial entities
- org-Non-profit organization
- net-Network providers

Structure of the domain name

Next let's take the domain name portion of the URL and work right to the left

Top level domain let's take an example

www.example .com **www.hiltonhigh.com**

second level domain www= Subdomain

www.**example**.com Hilton high= Second level domain

subdomain .com= Top level domain

www.example.com

what is URL?

URL stands for uniform resource locator, or in other words the web address of an online resource i.e. a website or document.

The URL is created in one or two ways after clicking a link in a web page, bookmark or email by typing the URL directly into the address bar

The protocols connected to the domain name and the domain names connected to the file path

Using the URL as an example, the three basic parts of the URL, you should understand are the protocol, the domain name and the path

Diagram

Protocol

The protocol declares hoe your web browser should communicate with the web server when sending or fetching a web page or document. The most common protocol is http which stands for Hypertext Transfer Protocol. Another common is https which stands for Hypertext Transfer protocol Secure.

Domain name

A domain name is a unique reference that identifies a web site on the internet, for example depot's case is up. The domain name always includes the top-level domain (TLD), which is Toepad's case is up. The co part is short hand for commercial and combined.co.uk is called a second-level domain (SLD)

Path

The path typically refers to a file or directory on the web server e.g. /directory/Filippo

SEARCH ENGINES

A search engine is a software program that can be used to find websites, web pages, and files on the internet.

To find a website or a web page, the user enters a word or phrase called the keywords or search texts in the search engines' text box, and the search engine then displays a list of all the websites or web pages that match the key words or search texts entered.

The URLs of several internet search engines are listed below

Search engine	**URL**
Alta vista	www.altavista.com
Excite	www.excite.com
Google	www.google.com
Hotfoot	www.hotbot.com
Lycos	www.lycos.com
WebCrawler	www.webcrawler.com
Yahoo!	www.yahoo.com
Ask me!	www.askme.com

COMMUNICATION PROTOCOLS

A protocol refers to an agreed set of rules and procedures concerning how devices (computers and peripherals) will transmit and receive data from one to another.

TCP/IP- (Transmission Control Protocol/ Internet Protocol). It is the basic communication language of the internet; it can also be used as a communication protocol in the private networks called intranets and extranets.

TCP/IP is a suite of protocols and includes:

- **HTTP (Hypertext Transfer Protocol)**- Is a set of rules for transferring files (text, graphic images, sound, video and other multimedia files) on the World Wide Web. As soon as web user opens his or her web browser, the user is indirectly making use of HTTP.
- **FTP (File Transfer Protocol)** is a network protocol used to transfer files from one computer to another over a TCP based network, such as the internet. **FTP** is often used to upload web pages and other documents from host computers to web-posting servers.
- **POP3(Post Office Protocol Version 3).** Is the protocol or "language" that's used to download your image from your ISP to your mail program.
- **IMAP: Internet Message Access Protocol.** Is the latest protocol that is more robust (strong) than POP3? It is a method for accessing E-mail messages that are kept on E-mail server.
- **VoIP (VoIP,** abbreviation of Voice Over Internet Protocol**)** commonly refer to as communication protocols, technologies, methodologies, and transmission techniques involved in the delivery of voice communications and multimedia sessions over Internet Protocols (IP) networks, such as the internet.
- **Telnet:** the main protocol for creating a connection with a remote system (server).
- It gives the user the opportunity to be on one computer system and do the work on another computer.
- **IRC (Internet Relay Chat)-** a protocol used for internet chat and other communications.
- **DNS (Domain Name System)-**translates network address (such as IP addresses) into terms understood by humans (such as Domain Names) and vice-versa.
- **DHCP (Dynamic Host Configuration Protocol).** This protocol automatically assigns internet addresses to computers and users

THE ELECTRONIC MAIL (E-MAIL)

E-mail, or electronic mail, is the transmission of messages via a computer network such as a local area network or the internet.

The message can be simple text or can include an attachment such as a word processing document, a graphical image, an audio clip, or a video clip.

E-mail software creates, sends, receives, forwards, stores, prints, and deletes e-mail messages.

An e-mail address is a combination of a user name and a domain name that identifies a user who sends or receives e-mail. (e.g. for the e-mail address dangelmutyaba@gmail.com, mutawa is the user name, gmail.com is the domain name.)

Structure of an e-mail

An e-mail is made up of many components that include:

1. **Compose, new:** enables one to write a new e-mail.
2. **Subject:** the user writes the title or heading of the message
3. **To:** Write the email address of the recipients, of the email
4. **C.C**: Make a copy of work to other recipients, but all will know that others have received a copy of the email
5. **B.C.C:** Makes a copy of an email to other recipients, but all will not know that others have a copy of the same email
6. **Inbox:** Shows the list of all incoming e-mail
7. **Delete:** Removes an e-mail from the in-box
8. **Flag as read:** shows that the e-mail was read
9. **Drafts:** when you finish creating your message, you can save a draft copy to allow you send the e-mail in some other time.
10. **Outbox**: This is where all of your complete outgoing mail (the mail you send to others) resides before you actually send it
11. **Trash:** This is like a recycle bin. This is where all the deleted e-mails are stored.
12. **Username/Login ID**-The name that you choose to represent your e-mail address.
13. **Password:** The secret code that you choose to correspond with your username.
14. **Reply**: This is a function that helps a user to respond to the person that an e-mail.
15. **Forward:** This is a function that allows us to take an e-mail that we are received and send it to a different a person than the one who sent it.

16. **An attachment:** This is a feature that helps a sender to append or to and files along with the message.

Advantages of using an e-mail over ordinary mail

a) Emails are delivered extremely fast when compared to a traditional post.
b) Emails can be sent 24 hours a day,365 days a year.
c) Webmail means emails can be sent and received from any computer, anywhere in the world, that has an internet connection.
d) Cheap-when using broadband, each email sent is effectively free. Dial-up users are charged at local call rates but it only takes a few seconds (for convectional email, e.g. text only) to send an email
e) Emails can be sent to one person or several people.
f) Computer files can be attached to an email.
g) Records and copies are kept automatically.

Disadvantages of using email over ordinary mail

A computer and other hardware (e.g. modem) are required.

It is not secure.

It is easy to get on junk mail lists.

The recipient needs access to the internet to receive email.

Viruses are easily spread via email attachments (most email providers scan emails for viruses on your behalf).

Phishing- sending an email to the user falsely claiming to be a legitimate company to scam the user into providing information, such as personal information and bank account numbers on a bogus website. The details will then be used for identity theft

No guarantee the mail will be read until the user logs on and checks their email

Spam- unsolicited email i.e. junk mail

INTERNET ETIQUETTES

NETIQUETTES, which is short for internet etiquettes, is a code of acceptable behaviors users should follow while on the internet. OR

Refers to do's and don'ts of online communication

Rules for email, social media and surfing the web include;

Keep messages brief and use proper grammar and spelling

Do not assume all materials is accurate or up-to-date

Never read someone's private email

Use your true identify while communicating using any social media

Use polite and avoid offensive language

Avoid impersonating other identities

Use emoticons (such as:)for smile) to express emotion

Read the **FAQ** (frequently asked question) document

Hard Bounce vs Soft Bounce

A hard bounce is an email that couldn't be delivered for permanent reasons

Reasons for hard bounce

Fake email address i.e. It could be incorrect

The email domain couldn't be the real domain

Email recipient server does not accept emails

Temporary server issues

Maintenance activities

SOFT BOUNCE

A software bounce is an email that couldn't be delivered because of temporary reasons

Reasons for the soft bounce

An inbox of the recipient may be full

Email file may be too large

Recipient email server is down or offline

THE CONCEPT OF CLOUD COMPUTING

DIAGRAM

Cloud computing refers to the use and access of multiple server-based computational resources via a digital network. E.g. WAN, internet connection using World Wide Web

Cloud computing is typical defined as a type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications

Types of cloud computing

There are four different ways to deploy cloud services: on a public cloud, private cloud, hybrid, or multi cloud

Public cloud services: Public clouds are owned and operated by third-party cloud service providers, which deliver computing resources like servers and storage over the internet

Private cloud: A private cloud refer to cloud computing resources used exclusively by a single business or organization. A private cloud can be physically located in the company's on-site data center

Hybrid cloud: Hybrid cloud offers a combination of public and private clouds, networked together in such a way that data and applications can be shared between them. Hybrid clouds offer businesses greater flexibility for scaling and deployment

Multi cloud: Multi cloud is a strategy that employs two or more cloud computing providers. Multi cloud strategies offer redundancy and the ability to select different cloud services or features from different providers.

Types of cloud services: IaaS, PaaS, serverless, and SaaS

Most cloud computing services fall into four broad categories: infrastructure as a service (SaaS), platform as a service (PaaS), serverless, and software as a service (SaaS).

Infrastructure as a service (IaaS): This is the most basic category of cloud computing service. With IaaS, you rent IT infrastructure- servers and virtual machines, storage, networking, operating systems.

Platform as a service: Cloud platform as a service (PaaS) refers to cloud computing services that supply an on -demand environment for developing, testing, delivering and managing software applications.

Serverless computing: Overlapping with PaaS, serverless computing focuses on building ap functionality without spending time quired to do so. The cloud providers handle the setup, capacity planning, and server management for you

Software as a service (SaaS): Software as a service is a method for delivering software applications over the internet, on demand, and typically on a subscription basis. With SaaS, cloud providers host and manage the software (SaaS application) and underling infrastructure, and handle any maintenance, like software upgrades and security patching.

Risks that are associated with cloud computing

1. **Information security and user`s privacy.** Using a service of cloud computing to store may expose the user to potential violation of privacy.
2. **Data migration problems when changing the cloud provider.** There is no defined standard between the operator and such a change is extremely complex. The case of bankruptcy of the cloud be extremely dangerous for the users.
3. **Effect of server breakdown.** A malfunction of the main server can affect a large number of users at once because these services are often shared on the network.
4. **International, political and economic problems:** May arise when public data are freely collected and privately stored from cloud`s users. No guarantee is given to the users for a free future access

Advantages of cloud computing.

Lower computer costs: You do not need a high-powered and high-priced computer to run cloud computing`s wed-based applications.

Since applications run in the cloud, not on the desktop PC, your desktop PC does not need the processing power or hard disk space demanded by traditional desktop software.

Cost efficient: Cloud computing is probably the most cost-efficient method to use, maintain and upgrade. Traditional desk top software costs companies a lot in terms of finance

Easy access to information. Once you register yourself in the cloud, you can access the information from anywhere, where there is an internet connection.

Automatic software integration: In the cloud, software integration is usually something that occurs automatically. This means that you do not need to take additional efforts to customize and integrate your applications as per your preference.

Backup and recovery: Since all your data is stored in the cloud, backing it up and restoring is relatively much easier than storing the same on the physical device.

It allows you customize your applications with great ease. You can handpick just those services and software applications that you think will best suit your particular enterprise

Quick deployment: Cloud computing gives you the advantage of quick deployment. Once you opt for this method of functioning. Your entire system can be fully functional in a matter of a few minutes

Easily scalable: Companies can add or subtract resources based on their needs

Device and location independence: Enable users to access system using a web browser regardless of their location

Relieves burden of IT professionals and frees up their time in office

A physical storage center is no longer needed.

Multi-tenancy enables sharing of resources and costs across a large pool of users.

Centralization of infrastructure in locations with lower costs such as real estate, electricity

Reliability is improved if multiple redundant size is used which makes well designed cloud computing suitable for business continuity and disaster recovery.

Instant software updates: another advantage to cloud computing that you no longer faced with choosing between obsolete software and high upgrade costs. When the application is web-based, updates happen automatically

Disadvantages of cloud computing

Technical issues though are true that information and data on the cloud can be accessed any time and from anywhere to all, there are times when this system can have some serious dysfunction, this technology is always prone to outages and other technical issues

You will need a very good internet connection to be logged unto the server at all times. You will invariably be stuck incase network and connective problems.

Less control comes when handing over all your data and information.

Dependency on third party to ensure confidentially of data information.

Long term dependency on cloud host for maintenance of your information.

Prone to attack. Storing information in the cloud make your company vulnerable to external hack attacks and threats .as you are well aware nothing on the internet is completely secure.

TOPIC 9

ELECTRONIC PRESENTATION SOFTWARE

Introduction to electronic presentation software

Software that is used to create presentations, which can communicate ideas and other information to a group of audience in form of slides. OR

Software program that is used to display information normally on the form of a slide show

Examples of presentation software

- Harvard graphics
- Ease
- IBM Lotus Freelance Graphics.
- Flow board
- Keynote (presentation software).
- Gnome Pinpoint (open source)
- Microsoft Power Point.
- Google Dishoard Graphics
- OpenOffice. Org Impress.
- Prezi
- Adobe (A 1dus) Persuasion
- Apple Keynote
- Custom Show
- Hewlett Packard Bruno (software)
- Kingsoft Presentation
- LibreOffice Impress (open source)
- Slide Rocket
- Lodewick
- PowToon

Features of presentation software

slide. A slide is an individual page in a presentation.

Slide layout. Refers to the physical arrangement of the slide.

Slide sorter.it is a facility in presentation that enables a user to arrange slides in a required order.

Slide master.is a slide that controls appearance of other slides in a presentation

Animations. These are visual effects applied to individual items on the slide such as graphics, titles or bullet points

Transition loop. It is a facility in presentation to run automatically until a user presses escape.

Or these are visual movements as one slide changes to another

Action button. A button on a slide that is programmed to link one slide to another.

Templates. Templates can be predesigned to be applied to a presentation give it a fully designed professional look.

Fill effect. Fill effect fill in the back ground of AutoShape, textbox, or word art you want to change like back ground, these can include gradients, patterns, pictures, solid colors or textures.

Other include

- Copy

Slide numbering

- Header and footer
- Find and replace

Principles of a good presentation

- Use simple background
- Text should be clear and that it can be seen from a distance
- There should be no clash between text color and the back ground color
- Use a picture that tells the story. Keep the audience with pictures rather than endless bulleted slides.
- Use minimal effects
- Insert your picture in the appropriate place.
- Pace the presentation. A good presentation should be well paced such that it flows smoothly while presentation.
- For automatic presentation rehearse the timing

Application areas of presentation

- Conferences
- Workshops
- Sales and marketing departments

- In schools
- Churches in displaying sermon scriptures

Advantages of presentation software over traditional chalk-and- talk approach

- Multimedia presentations can usually draw more attention from students.
- Contents of presentations can usually draw more attention from students.
- It simplifies teaching can take place even where there is no black board
- It is supplied with a large library of background templates which makes content presentation more attractive.
- It is excellent for summarizing facts
- Great for showing graphs/ charts /diagrams to an audience
- It is the best in presenting most dangerous experiments.

Advantages

- It is difficult for audience to take notes while presentation is taking place otherwise lose concertation
- Audiences are often happy to sit placidly and not interact with the presenter
- Not good in presentation some kinds of information such as complex math's equations.
- It is too easy to make a very bad presentation with too many animations affects and too much text, images.

TOPIC 10

INTRODUCTION TO DESKTOP PUBLISHING SOFTWARE

Desktop publishing refers to the process of producing publications like cards, newsletters, brochures etc., by designing their texts and graphics layout and inserting editing, formatting and printing of text and graphical objects using publishing software installed on the computer or

> Publishing is the process of producing publications like newspapers, cards, calendars, etc. that have special texts and graphics layout and designs.

Desktop publishing software Is a software that helps in producing publications like cards, calendars and others that have special texts and graphics and designs.

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 basing

Types of publishing software

They are two main types;

- ✓ **Graphical based;** they are specifically developed to edit, format graphical objects like pictures. Examples are;
  - ✓ *Adobe photoshop*
  - ✓ *Corel draw*
  - ✓ *Harvard graphic. etc.*
- ✓ **Layout based:** these specifically developed to create different page layout designs for texts and pictures examples are;
- ✓ *Adobe PageMaker and Microsoft publisher*

General examples of DTP applications

- Microsoft publisher
- Adobe PageMaker
- Adobe InDesign
- Quark Xpress
- Broderbund print shop pro

- Adobe illustrator

Features/ characteristics of DTP software

- They have color libras
- They have drawing and picture editing tools.
- They allow for color separation
- They do high quality graphics work
- Classic and newer designs
- Measurement units (pixels, centimeters, inches etc.)
- Page numbering
- Design gallery
- editing

common terms used in desktop publishing

- **baselines-**invisible ruled lines on the page on which text is positioned.
- **Bitmapped font-** a font that is created as a graphic image. usually such a font is not scalable fonts much be created for each point size needed
- **Bleed- a** term used to describe a graphic element that continues off the edge of a page; often phrased "bleed off the page"
- **Cropping-**it is removal of the outer part of an image to improve framing, accentuate (emphasize0 subject matter or change aspect ratio
- **Crop marks-**lines in a publication used to indicate to the printer where the publication should be cropped (or cut)
- **Gutter-**the amount of white space between character pairs
- **Kerning-** is the process of adjusting spacing between character pairs
- **Rulers-**horizontally and vertically scaled displays beneath the tool bar and the left of the workspace.
- **Layout guides-**these are lines that assist in accurately positioning objects on a page.
- **Ruler guides-**These are guides that are created in the foreground of individual pages by dragging a ruler while holding shift.
- **Rotate-**changing the position of an object in degrees
- **Grouping-**it is the turning of multiple objects into a single object
- **Handles-**small black objects, often dots or diamonds that appear around graphics and can be used to more or resize
- **Header-**a line of text that appears at the top of each page in a publication
- **Layout-**phrase that describes putting all of the text and graphic elements together to form a publication
- **Logo-**a company's symbol or graphic image that is used on stationary, invoices etc.
- **Masthead-**a space reserved at the top of certain types of publications such as newspapers or newsletters in which the name of the

publication and the publishing information appears. Often referred to as a "banner"

- **Template-**a publication skeleton upon which you build the actual publication

Advantages of electronic DTP

- 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 color will print exactly as specified
- DTP software supports colors separation for producing the master copies used in the final press work
- Enhances advanced designing of documents such as newsletters, cards, brochures more than other applications
- It is easy to use most especially layout based like adobe page maker and Microsoft publisher
- Templates are already inbuilt

TOPIC 11
DATA COMMUNICATION AND NETWORKING

Data communication/ computer mediated communication

Data communication refers to one computer transferring data, instructions to another computer or some other computers

Or

This refers to electronic transmission of information that has been encoded digitally from source to destination

Computer mediated communication.it is defined as any communicative transaction that occurs through the of two or more networked computers

Transmission techniques (computer mediated communication)

There are two basic transmission techniques for separating the groups of bits:

- Synchronous transmission
- Asynchronous data transmission

Synchronous: is a mode of communication where data is transmitted at regular intervals or in blocks

Asynchronous communication: is a mode of communication where data is transmitted at irregular intervals or bit at a time (random)

Elements of data communication

There are only four basic elements needed for data communication system

Sender: the computer or device that is used for sending data is called sender, source of transmitter. In modern digital communication system**,** the source is usually a computer
Medium: the means through which data is sent from one media to another is called ***transmission medium.*** If the receiver and transmitter within a building a wire connects them. if they are located at different locations, they may be connected by telephone lines, fiber, optics or microwaves
Receiver: the device /comp that receives the data is called receiver. It can be a computer, printer or machine
Protocols: these are rules under which data transmission take place between sender and the receiver
The basic models for computer consist of:
1.**A sending device** is the device that initiates an instruction to transmit data, instructions, or information.eg computer A, which sends out signals to another computer e.g. computer B
Communication device is a device that converts data, instructions or information from the sending device into signals that can be carried by communication channels e.g. modem. A which converts computers digits signals into analog signals.
Communication channel: path over which the signals are sent e.g. standard telephone line, along which the analog signals are sent. Communication channels take the following the methods /modes
Modes of data communication
the manner in which data is transmitted from one location to another is called data transmission mode. There are three ways or modes of transmitting data from one location and these are;

1. **simplex channel** it refers to a channel whose direction of transmission is unchanging. simplex transmission sends data in one direction only for example, television broadcast and a radio station are simplex channels because it always transmits the signals to its listeners and never allows them to transmit back.

The messages source is the transmitter, and the destination is the receiver
Advantages

- Cheapest communication method

Disadvantage

- Only allows communication in one direction

2. **A half -duplex channel**

A half -duplex transmission is a mode of transmission that allows data transmission in either direction but only one way at a time.
Is a signal physical channel in which the direction maybe reversed. In radio call, one part speaks while the other listens…speaking simultaneously results in garbled sound that cannot be understood,

email services, fax machine produce radio calls, credit card verification systems and automatic teller machines and wireless communication are examples of half duplex

Advantages

- Enables two-way communication
- costs less than full duplex

disadvantages

- only one device can transmit at a time
- costs more than aa simplex

3. a full-duplex or multiplex transmission

Allows simultaneous message exchange in both directions. it really consists of two simplex channels, a forward channel and a reverse channel, linking the same points. An example of full-duplex is a telephone set/calls in which one user can talk and another one listens at the same time.

Advantages

- enables two-way communications simultaneously

disadvantages

- it is the most expensive method in terms of equipment because of two band width required

Multiplex transmission

In multiplex transmission, several different types of signals can be carried once through the same line. E.g. During video calls where images

A communication device that receives the signals from the communication channel and converts into a form that can be understood by the receiving device. E.g. Modem B, which converts the analog signals back to digital signals

A receiving device (i.e. Computer B) that accepts the signals

Communication software, which consists of programs that manage the transmission of data, instructions, and information between computers

DATA COMMUNICATION TOOLS

There are devices that connect the communication circuits between the data and its destination

DATA TRANSMISSION

This is a physical transfer of data from one point to point to multi point communication channels. Any transmissions sent during these communications can be categorized by a number of characteristics including the signal type, transmission mode, transmission direction, and transmission rate

Therefore, data communication across the network can be in two forms i.e.; Analog Signal and digital signals

ANALOG SIGNAL

This is the transfer of data in form of electrical signal or continuous waves. Analog signal is measured in logs and its frequency in hertz (Hz)

ADVANTAGES OF ANALOG SIGNALS

Allows multi transmission against the cable

Suffers less alternation

DISADVANTAGES

Suffers from electronic magnetic interface

Can only be transmitted in one direction without supplicated

DIGITAL SIGNAL

This is the transfer of data in digits form or transfer of data in discrete values. They consist of binary digits which are 0's and 1's

ADVANTAGES

Equipment is cheaper than analog signal

Signals can be transmitted on a cable

Digital signals suffer from attenuation

Attenuation is the loss of signal strength in networking cables or connections

Techniques of Data Communication

There are two ways of sending data from the sender to the receiver i.e.

- Parallel transmission
- Serial transmission

Parallel Transmission

Each bit of character or data has a separate channel and all of characters transmitted simultaneously. Here the transmission is parallel character per character

Serial transmission

It refers to the transmission where data is sent as one bit at a time having a single channel the entire bit

DATA TRANSMISSION MEDIA

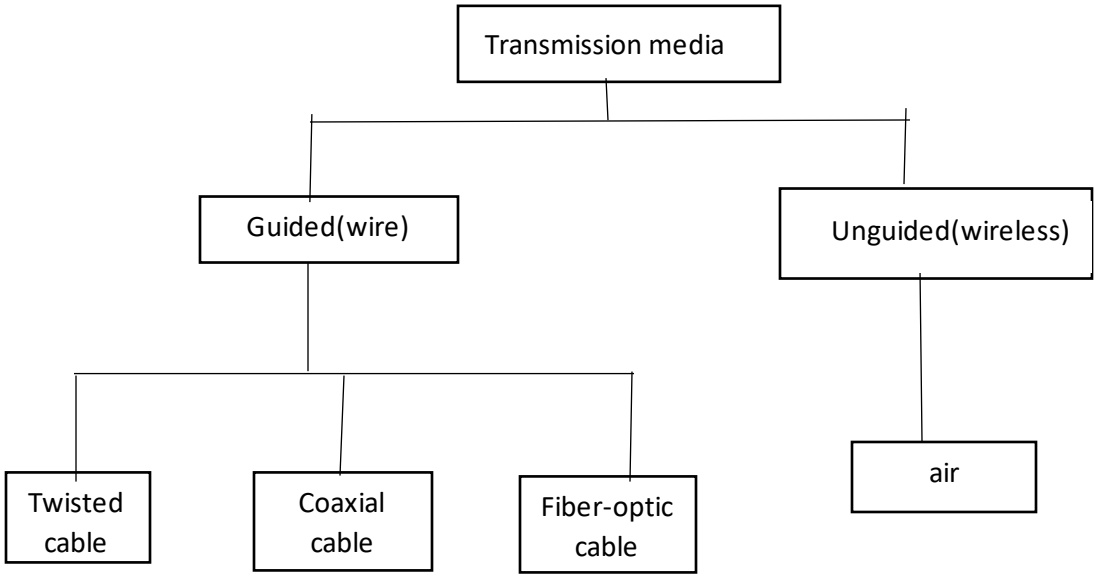
Transmission media refers to the physical materials that are used to transmit data between computers. There are pathways that connect computers

Computers and telecommunication devices use signals to represent data

These signals are transmitted from a device to another in the form of electromagnetic energy

Examples of Electromagnetic energy include power, radio waves, infrared light, visible light, ultraviolet light, and X and gamma rays

Classes of transmission media



Guided media. Are those that provide a conduit from one device to another. Examples: twisted-pair, coaxial cable, optical fiber

Unguided media (or wireless communication) transport electromagnetic waves without using a physical conductor. Instead, signals are broadcast through air (or, in a few cases, water), and thus are available to anyone who has a device capable of receiving them

1.GUIDED/WIRED MEDIA

There are three categories of guided media

- Twisted-pair cable
- Coaxial cable
- Fiber-optic cable

Twisted pair cable

Twisted pair cabling comes in two varieties: shielded and unshielded

Unshielded twisted pair (UTP) is the most popular and is generally the best option for school network

Consist of two insulated copper wires arranged in a regular spiral pattern to minimize the;

- Electromagnetic interference between adjacent pairs
- Low frequency transmission medium
- Low cost, small size, and ease of installation
- Limited distance, usually less than 100 meters
- The most popular and is generally the best option for school networks

Advantages of Unshielded Twisted pair cables:

- It is of low cost
- It is small in size
- It is easy to install
- It is the most popular and generally the best for schools

Disadvantages:

- Subject to interference
- Limited distance, usually less than 100 meters

Shielded Twisted Pair (STP) Cable

STP cables has a metal foil or braided-mesh covering that enhances each pair of insulated conductors. These include;

Coaxial cable is a type of copper cable specially built with a metal shield and other components engineered to block signal interference

Characteristics

- Coaxial cabling has a single copper conductor at its center.
- Has an inner conductor surrounded by a braided mesh?
- Both conductors share a common center axial, hence the tarmac-axial"
- Bandwidth of up to 400MHz
- Highly resistant to signal interference
- Used for long distance (300-600 meters)
- Quite bulky and sometimes difficult to install

- The most common type of connector used with coaxial cables is the has two types of coaxial cable;
  Thin coaxial cable
  Thick coaxial cable
- Coaxial cable is insulated more heavily than twisted-pair cable. So, it is highly resistant to signal interference
- Used for longer distances (300-600 meters)
- Transmits faster than UTP

Disadvantages

- Heavy& bulky
- Needs booster over longer distances

Fiber optic cable

A fiber optic cable

Is a network cable that contains strands of glass fibers inside an insulated casing. Fiber optic cabling consist of a center glass core surrounded by several layers of protective materials. It transmits light rather than electronic signals eliminating the problem of electrical interference.

Characteristics

- Consist of a center glass core surrounded by several layers of protective materials
- Immunity to environmental interference
- Greater capacity (bandwidth of up to 2GBPS)
- Used for distances up to 100 kilometers
- Carry information at vastly greater speeds
- Difficult to install and modify, require highly skilled installers.
- Adding additional nodes is difficult.

Advantages

- Carry significantly more signals than other cables.
- Faster data transmission.
- Less vulnerable to electrical noise from other devices.
- Better security for signals during transmission.
- Smaller size and much thinner and lighter than other cables.

Disadvantages

- Expensive as compared to other media.
- Harder to install and modify.

2.UNGUIDED MEDIA/WIRELESS MEDIA

Wireless media are telecommunications technologies that transport digital communications without cables between communications devices.

Examples of wireless communications.

Cellular radio, microwaves, communications satellites, and infrared & Bluetooth.

a) **Microwares.** Microwaves are high-frequency radio waves that are sent through the atmosphere and space to deliver

telecommunications services, including TV distribution. It is dependent on line of sight.

b) **Commination satellite.** A satellite is basically a microwave station placed in outer space. The satellite receives a signal from the earth, amplifies it, and then rebroadcasts it at a different frequency to any number of earth-based station.

c) **Bluetooth-** A short range wireless technology.

Bluetooth is an open wireless protocol for data exchange over short distances.

Operate at approx. 1Mbps with rage from 10 to 100 meters.

d) **Infrared-** Electromagnetic waves whose frequency range is above that of microwares, but below that of the visible spectrum.

Advantages of wireless network

- **Mobility-**With a laptop computer or mobile devices, access can be available throughout a school, at the mall, on an airplane etc.
- **Fast setup -**If your computer has a wireless adapter, locating a wireless network can be as simple as clicking "Connect to a Network" – in some cases, you will connect automatically to networks within range.
- **Cost effectiveness-** Setting up a wireless network can be much more cost effective than buying and installing cables.
- **Expandability-** Adding new computers to a wireless network is as easy as turning the computer on (as long as you do not exceed the maximum number of devices).

Disadvantages of wireless network

- **Security-**Be careful. Be vigilant. Protect your sensitivity data with backups, isolate private networks, provide strong encryption and passwords, and monitor network access traffic to and from your wireless network.
- **Interference-**Because wireless networks use radio signals and similar techniques for transmission, they are susceptible to interference from and electric devices.
- **Inconsistent connections-**Wireless connections are not nearly as stable as those through a dedicated cable.
- **Speed-** The transmission speed of wireless networks is improving; however; faster options (such as gigabit Ethernet) are available via cables. If you also moving large amounts of data around a private network, a cabled connection will enable that work to proceed much faster.

INTRODUCTION TO COMPUTER NETWORKS

What is a computer network?

A computer network can be defined in one of the following ways:

Is a connection of two or more computers for the purpose of routing, managing, and storing rapidly changing data?

Two or more computers that are linked in order to share resources, exchange files, or allow electronic communications. Is a system for communication among two or more computers.

Classification of Networks

Computer network are set up in four major classes. These are:

Local area network (LAN): Is a computer network covering a local area, like a home, office or small group of buildings such as a college. The topology of a network dictates its physical structure. The generally accepted maximum size for a LAN is $1000m^{2.}$

LAN configuration consists of:

- **A server is a computer that** stores all of the software that control the network, as well as the software that can be shared by the computers attached to the network.
- **A workstation.** Computers connected to the file server. These are less powerful than the file server.
- **Cables**. Used to connect the network interface cards in each computer.

Metropolitan Area Networks or MANs:

It is network that combines two or more LANs connected together.
Are large computer networks usually spanning a campus or a city. They typically use optical fiber connections to link their sites.

Wide Area Network or WAN:

Is a computer network covering a wide geographical area, involving vast group of computers? The best example of a WAN is the Internet. using a WAN, schools in Uganda can communicate with places like Tokyo in a matter of minutes, without paying enormous phone bills

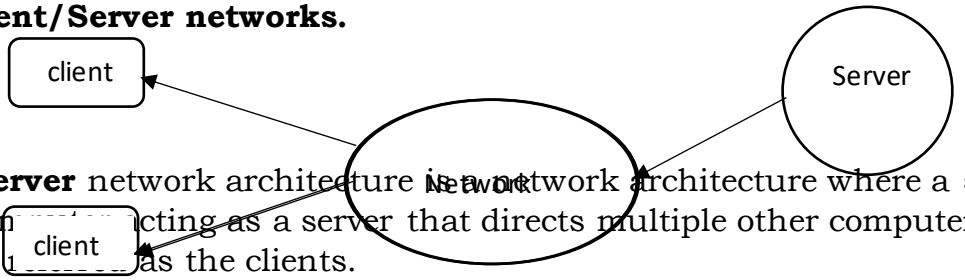
Wireless Local Area Network (WLAN):

A LAN local area networks based on wireless network technology mostly referred as Wi-Fi. Unlike LAN, in WLAN no wires are used but radio signals are the medium for communication. wireless network cards are required to be installed in the system for accessing any wireless network around.

NETWORK ARCHITECTURE.

Network architecture refers to the layout of the network, consisting of hardware, software, connectivity, communication protocols and mode of transmission such as wired or wireless. These include;

Client/Server networks.



Client /server network architecture is a network architecture where a single central computer acting as a server that directs multiple other computers, which are known as the clients.

Client software on the other hand commonly runs on common PCs or workstations. Clients get all or most of their information and reply on the application server for things such as configuration files, stock quotes, and business application programs or to offload computer free to perform other tasks.

Advantages of a client /server network:

- **Centralized resources**-resources and data security are controlled through the server.
- **Scalability**-any or all elements can be replaced individually as needs increase.
- **Flexibility**-New technology can be easily integrated into system**.**
- **Interoperability**- all components (client/network/server) work together.

- **Accessibility-**server can be accessed remotely and across multiple platforms.

Disadvantages of a client /server network:

- Expensive – requires initial investment in dedicated server.
- Maintenance -large networks will require a staff to ensure efficient operation.
- Dependence -when server goes down, operations will cease across the network.

A peer -to-peer (or P2P) computer network:

It is a network in which resources and files are without a centralized management source. All computers are considered equal, computers act like stand-alone, and clients are able to perform independently.

Advantages of a peer-to-peer network:

- ✓ Less initial expense- No need for a dedicated server.
- ✓ You can access any file on the computer as long as it is set to shared folder.
- ✓ Easy to set up. The configuration of peer to peer is very easy because there is no need for a central server and every computer can work independently.
- ✓ If one computer fails to work all the other computers connected to it continue to work.

Disadvantages of peer-to-peer network:

- ✓ Decentralizes management -No central arsenal for files and applications.
- ✓ Without centralized network administration, it is difficult to determine who controls network resources.
- ✓ Without centralized security, each computer must use separate security measures for data protection.
- ✓ More complex and difficult to manage as the number of computers on the network increases.
- ✓ Without centralized data storage, data backups must be performed by users.

NETWORK TOPOLOGIES

The physical topology of a network refers to the configuration of cables, computers, and other peripherals. Computer network topology is the way various components on a network (like nodes, links, peripherals. etc.) are arranged.

Or

A physical topology defines the way in which computers, printers, and other des are connected to a network

Considerations when choosing a topology:

Type and number of equipment being used

Planned applications and rate of data transfers

Required response times

Cost – a linear bus network may be the least expensive way to install network; you do not have to purchase concentrators.

Length of cable needed. The linear bus network uses shorter lengths of cable

Future growth. With a star topology, expanding a network is easily done by adding another concentrator.

Cable type. The most common cable is unshielded twisted pair, which is most often used with star topologies.

Forms of network topologies include:

Bus topology: a bus network is such that there is a single line (the bus) to which all nodes are connected and the nodes connect only to this bus.

Advantages

- Easy to implement and extend
- Well suited for temporary networks (quick set-up)
- Typically, the cheapest topology to implement
- Failure of one station does not affect others
- Easy to connect a computer or peripheral to a linear bus.
- Requires less cable length than a star topology

Disadvantages

- Difficult to administer/troubleshoot
- Limited cable length and number of stations
- A cable break can disable the entire network
- Maintenance costs may be higher in the long run
- Performance degrades as additional computers are added
- Entire network shuts down if there is a break in the main cable
- Terminators are required at both ends of the backbone cable
- Difficult to identify the problem if the entire network down
- Not meant to be used as a stand-alone solution in a large building

Mesh topology:

A network topology in which there are at least two nodes with two or more paths between them. A special kind of mesh, limiting the number if hops between two nodes, is a hypercube.

Advantages of mesh topology

- Data can be transmitted from different devices simultaneously
- Even if one of the computers fails, there is always an alternative present; therefore, data does not get affected
- Expansion and modification in the topology can be done without disrupting other nodes.

Disadvantages

- There are high chances of redundancy in many network connections
- Overall costs of this network are too high as compared to other networks.
- Set-up and maintenance of this topology is very difficult
- Difficult to administer

Ring topology

A network topology in which all the nodes are connected to each other in such a way that they make a closed loop. These nodes are branches form a ring. If one of the nodes on the ring fails then the ring is broken and cannot work. A dual ring topology has four branches connected to it, and is more resistant to failures.

Advantages

- Growth of the system has minimal impact on performance
- All stations have equal access
- Each node on the ring acts as a repeater, allowing ring networks to span greater distance3s than other physical topologies

Disadvantages

- Often the most expensive topology
- Failure of one computer may impact others

Star topology

A network topology in which peripheral nodes are connected to a central node, which rebroadcasts all transmissions received from any peripheral node to all peripheral nodes on the network, including the originating node. All peripheral nodes may thus communicate withal others by transmitting to, and receiving from, the central node only.

Advantages

- Easy to implement and extend, even in large networks
- Well suited for temporary networks quick setup
- Centralized management. It helps in monitoring the network
- Failure of one nodded does not affect the rest of the network
- At the same time, it is easy to detect the failure and trouble shoot it.

Disadvantages

- Too much dependency on the central device has its own drawbacks. If it fails the whole system goes down
- Maintenance costs may be higher in the long run
- Performance degrades as additional computers are added
- Failure of the central node can disable the entire network
- Requires more cable length than the linear topology.

- More expensive than the linear bus topologies because of the cost of the hubs etc.

Tree or hyper tree topologies;

A tree topology combines characteristics of linear bus and star topolies.it consists of groups of star-configured workstations connected to a linear bus back bone cable

Advantages of a tree topology

- Point-to point wiring for individual segments
- Supported by several hardware and software vendors
- The networks don't fail even when a link between two nodes is broken

Disadvantages

- Overall length of each segment is limited by the type of cabling used
- If the back bone line breaks, the entire segments goes down
- More difficult to configure and wire than other topologies

Requirements for setting up a network

(Networking hardware)

networking hardware includes all computers, peripherals, interface cards and other equipment needed to perform data processing and communications within the network

This section provides information on the following components

1. **File server**

Is high capacity computer that provides

Various resources to the network

The server requires:

- A very fast computer with a large amount of RAM and storage space, a fast network interface card, and a tape back- up device
- Network operating system such as windows 2000, XP…, Novell Netware, windows NT Server, or apple share

2. **Workstations**: a computer in a network is called a work station or client.it requires a network interface card, not necessarily need floppy disk drives or hard disks since files can be saved on the file server
3. **Network interface cards (NICs)**
   NIC provides the link between your computer and your network.it provides the physical connection between the network and the work station.

Most NICS are internal, with the card fitting into an expansion slot inside the computer, others are built on the motherboard
The type of NIC affects the speed and performance of a network
Three common networks interface connections exist; Ethernet Cards, local talk connectors, token ring cards

4. **A Hub or a concentrator**

A hub is a device whose primary function is to send and receive signals along the network between the nodes connected to it

- It connects multiple devices to the network
- It serves as a central meeting place for cables from computers, servers and peripherals
- It is usually configured with 4,8,12, or 24RJ-45ports

5. **A repeater**

A repeater is a device that regenerates and amplifies signals to create long- distance networks

- It simply receives, amplifies and rebroadcasts the signals. Some repeaters provide basis error- checking
- repeater can be a separate device or it can be incorporated concentrator.it is used to overcome distance limitations

6. **bridge**

Abridge is a device that links two homogenous packet-broadcast local networks.

- It accepts all packets from each network addressed to devices on the other buffers them, and retransmits them to the other network.
- It connects two or more networks using the same address method or protocol.
- It can provide some addressing information.
- Monitors and manages the traffic to maintain optimum performance on both sides of the network often used when LANs reach their capacity of nodes

7. A switch

It is an electronic device that joins multiple computers together within local area network (LAN)

- It is an intelligent hub that maintains a bridging table, keeping track of which hardware addresses are located on which network segment

8. **a router**

this is a device that connects multiple computers and forwards data packets from one point to another on the network.it also connects multiple computers to a single DSL line for internet access

routers are similar to bridges in that they link two or more physically separate network segments. The network segments linked by a router, however, remain logically separate and can function as independent networks.

Routers;

- Translate information from one network to another; similar to a super-intelligent bridge.ie receive information from a cabled network and transmit it wirelessly.
- Maintain a map of the network, select the best route for data.
- Have information on source addresses. Destination addresses and transmit distances

Advantages of computer networks

- **Speed.** Networks provides a very rapid method for sharing and transferring files
- **Cost.** Networkable versions of many popular software programs are available at considerable savings when compared to buying individually licensed copies.
- **Security.** Files and programs on a network can be designated as "copy inhibit" so that you do not have to worry about illegal copying of programs
- **Centralized software management**. One of the greatest benefits of. installing a network at a school is the fact that all of the software can be loaded on one computer (the file server).
- **Resource sharing. sharing** resource is another area in which a network exceeds stand-alone computers
- **Electronic mail** the presence of a network provides the hardware necessary to install an e-mail system-mail aids in personal and professional communication for all school personnel, and it facilitates the dissemination of general information to the entire school staff
- **Flexible access** school networks allow students to access their files from computers throughout the school
- **Workgroup computing** workgroup software (such as Microsoft back office) allows many users to work on a document or project concurrently.

DISADVANTAGES OF COMPUTER NETWORKS

- **Expensive to install** although a network will generally save money over time, the initial costs of installation can be prohibitive. Cables, network cards and software are expensive, and the installation may require the services of the technician
- **Requires administrative time.** Proper maintenance of a computer network requires considerable time and expertise. Many schools have installed a network, only to find that they did not budget for the necessary administrative support.
- **File server may fail.** Although a file server is no more susceptible to failure than any other computer when the files server "goes down" the entire network may come to a halt. When this happens, the entire school may lose access to necessary programs and files.

- **Cables may break.** The Topology chapter presents information about the various configurations of cables. Some of the configurations are designed to minimize the inconvenience of a broken cable; with other configurations, one broken cable can stop the entire network.

TOPIC 12
DATABASES
INTRODUCTION TO DATABASES

A database is a collection of interrelated data, which allows the user to retrieve, update and manipulate data very easily as required. **Or** it refers to the collection of related information stored in a structured form. **or** is a collection of data stored in fields and records in an organized way.

TYPES OF DATABASES

The database is divided into two categories;

1) **Flat-file database.** This refers to the database that Is consisting of a single table. It is used just to maintain simple records. For example

ID	Name	Team
HS1	Nab bale shadier	Panther
HS2	Mayanja kelvin	Lion
HS3	Wasswa Mulumba	Kobe
HS4	Naumkeag Barbra	Crane
HS5	Ayebale Joseph	Lion
HS6	Guido Allan	Panther

Advantages of flat-file database

- Easy to understand since it contains single data
- Easy to implement
- Less hardware and software requirements
- Less skills required to implement a flat-file database

Disadvantages of a flat-file database

- Less security since it is easy to extract
- Data inconsistence
- Redundancy
- Sharing information is cumbersome task
- Slow for huge data

2) **Rational database.** It is a database file that consists of more than one tables and the relationship can be created between tables of the common field relational database.

Advantages of relational database

- It is easy to manage endless sets of data in tables without having to go back and reenter data at the second time
- It is easy to create separate records for each type of data stored

- Relational database has the ability to access, update and to share information among many users
- It has the ability to scale the database to the size of a large organization
- It has the ability to program a query to search all tables for the exact information you need.
- It is easy and simple to manage.
- Relational database can interface with many third-party tools.
- Security control and authorization can be implemented.

Disadvantages of relational database

- Once the database is created, it can easily be changed
- It has complex applications and systems that are difficult to understand.
- It takes time to enter all the information and set up the program.
- There is need to hire specialized people to create a rational database.
- There is need to hire database administrators to maintain the database once it is built.
- Securing your data against un authorized access in order to meet the regulatory standards can be expensive.
- Some relational database has limits on the field length. When you design the database, you have to specify the amount of data to fit into the fields.

Terms used in database

- **Record.** This is a row in a table that contains information about a given person product or event.
- **Field.** This is a column in a table that contains a specific piece of information within a record.
- **Data entry.** This is the process of getting information into a database, usually done by people through typing in the way of data entry form designed to simplify the process.

Database management system

Database management system can be defined as software package with computer programs that control the creation, maintenance and of a database. **Or** This is an application package which permits the creation, storage, management and retrieval of data in the database.

Examples of database management system

- Lotus approach
- Open office. Org
- Base
- Corel paradox
- Microsoft access
- dbase
- Fox pro
- Oracle

- DATABASE mac
- Cal point
- Interpose
- File maker
- File pro
- Fox pro
- Front base
- Gemstone(database)
- IMB business
- System 12
- IBM DB2 express
- Mime SQL
- Microsoft jet
- Database engine
- Model 204
- MSDE
- MSQL
- One Tick

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 checked for consistency and reliability.
- A database is flexible since it can redesign to hold thousands of data.
- A database can be used by many people at the same time.
- Data is frequently updated after each single party.
- Data is automatically saved as soon as it is entered into a database.
- Data can be retrieved in different formats e g form, table reports e t c

  Features of database.
- **Rich set of types.** Specify text, numeric, file attachment, images and compound fields.
- **Tables /file structure.** This is a database structure that is used to hold related records. Tables are organized in rows and columns with each row representing while each column represents common fields in each record.
- **Forms /screen input.** A form is a graphical interface that resembles ordinary forms to collect data. However, a data enables the user to view and enter data into a table.
- **Reports. most** database systems provide the user with a tool for generating reports from an underlying table or a query.

- **Macros.** Some database software provides the user with a tool called macro that can be used to automate frequently performed procedures or tasks.

Relationship in database tables

A relationship in database is a situation that exists between two relational database tables when one table has a foreign key that references the primary key of the other table.
Relationships allow one relational database to split and store data in different tables, while linking disparate data items.

Types of relationships

There are three types of relationships that can be implemented in your access database.

1. One -to-one relationship
2. One-to -many relationship
3. Many-to-many relationship

One -to -one relationship

In a one to one relationship. Each row in one database table is linked to one and only other row in another table. In a one to one relationship between table A and table B, each row in number of rows in table B.

One – to – many relationships

Two tables are related in a one to many(1-M) relationship if for every row in the second table there is exactly one row in the first table.

Many-to -many relationships

Two tables are related in many to many(M-M) relationship when for every row in the first table, there can be many rows in the second table.

DATA TYPES IN DATABASE

Integer. A term used to refer to a data type which represents some fine subset of the mathematical integers. An integer is specified in the program as a sequence of digits without spaces or thousand separators, optionally prefix with + or-

Booleans. Is a data type having two values usually denoted true or false, intended to represent the truth values of logic and Boolean algebra?

Characters. A unit of information that corresponds to a unit, symbol such as in an alphabet written form of a natural language. Examples of characters include; letters, numerical digits and common punctuation marks (such as “, or “- “)

Floating-point numbers. Floating point describes a system for representing real numbers which supports a wide range of values. Numbers are in general represented approximately to affixed number of significant digits and scaled using an exponent. The base for the scaling is normally 2, 10 or 16.

Common field types used in database

Text. It is used to store characters, numbers, special characters etc. These fields are used to store names of persons, addresses, telephone numbers etc.

Number. These are fields made up of numeric numbers 0 to 9 to be manipulated mathematically.

Memo. This is a field made up of alphanumeric (both alphabetic and numeric) data. Instead of using text use this data type if you need to enter several paragraphs of text because it accommodates a maximum of 32000 characters.

Currency. Used to identify numeric values that have decimals or fractions. Use this data type field especially when dealing with monetary values such as fees balance, sales etc.

Data/Time. This is used to identify as either a date or time. This is because date/time values can be manipulated mathematically in a data base

AutoNumber. This is numeric value used if you wish M.s Access to automatically increment the values in a field

Yes/No. This is a logical field where an entry is either a yes or a no, true or a false. For example, a field may require you to answer whether you are a male or a female.

OLE object. OLE stands for linking and embedding. This type of field is mostly used with graphical user interface application for inserting graphical objects such as pictures, drawing, charts etc.

Common terms in database management system

Primary key: It refers to the column or a combination of columns that uniquely identities each record in the table. E.g. Employee number, account number, admission number etc.

Foreign key: It is a field in a relational table that matches a primary key of another table. It can be to cross reference tables.

Data validation: It is the process of ensuring that a program operates on clean, correct and useful data. It uses routines called "**validation"** that checks for correctness, meaningfulness and security of the data that are input to the system.

TOPIC 13

SYSTEM SECURITY, ICT ETHICAL ISSUES AND EMERGING TECHNLOGIES.

Computer System Security:

Computer security involves safeguarding computing resources, ensuring data integrity, limiting access to unauthorized users, and maintaining data confidential

OR

Computer Security can also refer to maintaining of the hardware, software and data

Computer system threats

The range of means by which the security and integrity of computing resources can be threatened is very broad, and encompasses:

- ✓ Operator error (for example a user unintentionally deleting the wrong file).
- ✓ Hardware or media failure (either as a result of wear-and -tear, old age or accidental damage).
- ✓ Theft or sabotage (of hardware and/or data or its media).
- ✓ Hackers (who obtain unauthorized online access via the internet)
- ✓ Malware (any form of virus, and including "Trojan" e-mail attachments that users are encouraged to open).
- ✓ Power surges and/or outages (which are one of the most common means of hard disk corruption and hardware damage).
- ✓ Flood, fire, storm or other natural disasters.
- ✓ Fraud or embezzlement (Misappropriation).
- ✓ Industrial espionage.
- ✓ Water
- ✓ Fire
- ✓ Lightening
- ✓ Dust
- ✓ Short circuits
- ✓ Magnetic fields

Forms of computer security (how to protect computer systems)

- **Authentication.** It refers to the verifying the identity of user logging onto the network. Passwords, digital certificates, smartcards and biometrics can be used to prove the identity of the user on the network.

- **Data backup.** Users should frequently duplicate (copy) the information to different storage mediums such as DVDs, CDs flash disks, external hard disks to be able to recover their information in case of loss from any disaster.
- **Intrusion detection.** Is the art and science of sensing when a system or a network is used inappropriately or without authorization… An intrusion detection system (IDS) monitors computer system and activities.
- **Data encryption.** Is a security measure by which the data is transformed to another unreadable format to prevent unauthorized access by others. The data has to be decrypted to make it readable when it reaches its final destination. Encryption is done by a software called cryptographic software
- **User ID and passwords; -**this is to restrict access to computer system, only allowing authorized users. A **password** is a secret code that combines characters and numbers that allow a user to access to computer or network.
- **Antivirus software.** Is a computer program that detects, prevents and takes action to disarm or remove malicious software programs such as viruses and worms from the computer? To prevent the most current viruses you must update your antivirus software regularly.
- **Authorization**; Is a security measure used in network design to prevent users from gaining information, files or resources that are beyond their security clearance. It also prevents outsiders from gaining access to the network.
- **Firewall;** on the computer, this security measure acts much like a guard computer. The firewalls determine if that traffic should continue on to its destination or be stopped.
- **Biometric systems.** These are systems that use measurements of human feature such as fingers, eyes in order to identify people. Biometric devices include; voice recognition devices, face recognition devices, finger print recognition devices.

Other methods used to ensure computer security.

- **Don't run programs of unknown origin;** Never run a program unless you know the source of the program or the author
- **Disable hidden filename extensions;** windows operating system contains an option to hide file extensions for known file types. The option is enabled by default, but you can disable this option in order to have file extension displayed by windows.
- Turn off the computer or disconnect it from the network when not in use
- Make a boot disk in case your computer is damaged
- Don't open unknown email attachments.

Malware

What is a malware?

Malware is a short form for **malicious software.**

It refers to any software used to disrupt computer operation, gather sensitive information, or gain access to private computer system.

Malware include ransomware, spyware, adware, scare ware computer viruses, worms, Trojan horses and other malicious programs.

What is ransomware?

Ransomware is a type of malware which restricts access to the computer system that infects, and demands a ransom paid to the creator of malware in order for the restriction to be removed.

Some forms of ransomware encrypt files on the systems hard drive (**crypto viral extortion**), while some may simply lock the system.

What is a scareware?

Scareware is a type of malware designed to trick victims into purchasing and downloading useless and potentially dangerous software. Scareware generates pop-ups that resemble windows system messages, usually purports to be antivirus or antispyware software, a firewall application or registry cleaner.

What is adware?

Adware is frequently used to describe a form of malware which represents unwanted advertisement to the user of a computer. The advertisement produced by adware are sometimes in the form of pop-up.

What is spyware?

Spyware Is software that aids in gathering information about a person or organization without their knowledge and that may send such information to another individual without the consumers consent or that claims control over a computer without the consumers knowledge.

Computer Viruses

What is a computer Virus?

A computer virus is a program designed specifically to damage, infect and affect other programs or data or cause irregular behavior of the computer without the permission of the user. Or

Ways of spreading Computer Viruses (Sources)

There are many ways in which a virus can spread from one computer to another, but let's take a look at the most frequent ways in which people run into virus's spyware and Trojans on the internet.

1) Email attachments
2) Infected boot disks
3) Infected software
4) Fake antivirus software
5) Infected proprietary software
6) Fake games

Types of viruses include the following;

a) **Boot Sector Virus.** Is a virus which executes when a computer starts up because it resides in the boot sector of the floppy disk or the master boot record of the hard disk (MBR).
b) **A File Virus.** This attaches itself to program files, and is loaded into memory when the infected program is run.
c) **Micro Virus.** This uses the macro language of an application (e.g. Word processor or spreadsheet) to hide the virus code.
d) **Logic Bomb.** Is a virus that activates when it detects a certain condition.
e) **Time Bomb.** Is a kind of logic bomb that activates on a particular date.

f) **Worm.** Is a small piece of software that uses computer networks and security holes to replicate itself without human action. A worm is similar to a virus by design and considered to be a sub class of a virus except that a virus does not have capacity to travel without human action.

g) **Trojan horse.** Is the program that hides within or looks like a legitimate program, but will actually do damage once installed or your computer.

h) **Polymorphic Virus.** This modifies its program code each time it attaches itself to another program or files, so that even an antivirus utility has difficulty in detecting it.

Examples of computer viruses

Love Letter: The fastest spreading virus in history appears to have been written by a resident of Manila in the Philippines. Sent via e-mail in May 2000 with "I LOVE YOU" in the subject field, it replicated itself to everyone in the user's Outlook address book and then destroyed lock files. Love letter forced numerous organizations to shut down their email systems, as computer users were far too willing to let love into their lives.

CIH (a.k.a. Chernobyl: This virus, written by Taiwanese student chen lng-Hau, triggers on the anniversary of the Chernobyl meltdown. The virus attacks the BIOS chip on the computer, effectively paralyzing your entire PC.

Melissa: David L. Smith, 31, named his virus after a stripper he knew in Florida. His virus created chaos in March 1999 when it spread around the world in a day, clogging up e-mail systems and inserting quotes from Bart Simpson into documents.

Nida: Meaning "admin" spelled backwards and launched in September 2001, this denial-of-service worm flooded hard disks on more than a million clients and servers on the internet.

911: No relation to 9/11 in New York, the 911 virus was seen in Houston, Texas. It takes over the computer modem and dials emergency services.

Kylie: This virus, fortunately rarely encountered, plays the pint-sized Australian popstars song "Never too late "through your PC speaker.

SMEG;" Smoke me a kipper; I will be back for breakfast! Unfortunately, most of your data wont!" The Stimulated Metamorphic Encryption Generator viruses, written by the Black Baron, trashed hard disks up and down the country in the mid-1990s.The author, Christopher Pile, was a fan of the Red Dwarf series and ended up being sentenced to 18 months in prison.

Nuclear; This word macro virus adds a paragraph to the end of every document you print protesting in the South Pacific.

Coffee shop; Written by the trident virus writing gang based in the Netherlands, the Coffeeshop virus displays a large cannabis leaf on the screen of your PC and urges the government to legalize marijuana.

Casino; Casino was written on the island of Malta and plays Russian roulette with your hard disk. If you get the number wrong, you lose everything.

Precautions that should be taken to guard against computer viruses.

1) Ensure that there is a policy to ensure the usage of computers and their protection and regulations

2) Ensure that the e-mail is from a trusted source before opening or executing any e-mail attachment.
3) Install an antivirus utility and update its virus definitions frequently for detecting and removing viruses.
4) Never start up a computer with a floppy disk in a floppy drive.
5) Scan all floppy disks and files for possible virus infection before opening them.
6) Set the security level for macros in an application so that the user can choose whether or not to run potentially unsafe macros.
7) Write protect the recovery disk before using it.
8) Back up important files regularly.

Antivirus software

Antivirus software is a software programs that scans and removes computer viruses from the computer.

Examples of antivirus programs

- ✓ Norton antivirus
- ✓ Avira antivirus
- ✓ AVG antivirus
- ✓ Kaspersky
- ✓ Avast antivirus
- ✓ Virus cedes
- ✓ McAfee security scan plus

Computer crime refers to the illegal or unauthorized use of computer technology to manipulate critical user data.

Or Computer crime can be defined as unauthorized/illegal use of a computer commit it a crime.

Computer Crimes Vs Cyber Crime

(Internet and network attacks)

Computer crime can be defined as unauthorized/illegal use of a computer to commit a crime

Or It refers to any crime that involves a computer and a network

Cybercrime refers to online or Internet-based illegal acts. These include;

- ✓ Hacking,
- ✓ Denial of service attacks,
- ✓ Cyber vandalism,
- ✓ Spam
- ✓ Copyright infringement,
- ✓ Child pornography,
- ✓ Fraud,
- ✓ Child pornography,
- ✓ Money laundering, and counterfeiting
- ✓ Cyber terrorism,
- ✓ Phishing
- ✓ Pharming
- ✓ Spoofing

- ✓ Malware such as viruses
- ✓ Identity theft and
- ✓ Cyber stalking
- ✓ Eavesdropping

Spam; or the unsolicited sending of bulk email for commercial purposes, is unlawful. This involves sending bulk mail to persons not known to you.

Fraud; Fraud is when trickery is used to gain a dishonest advantage, which is often financial, over another person.

Obscene or offensive content; The content of websites and other electronic communications may be unpleasant, obscene or offensive for a variety of reasons. In some instances, these communications may be illegal e.g. pornography.

Harassment; it directs obscenities and belittling comments at specific individuals focusing for example on gender, race, religion, nationality, sexual orientation.

Threats; it involves written or recorded messages intended to scare an individual or a group of individuals as a group. This may involve writing threatening, belittling messages to the user.

Cyber terrorism; It refers to politically motivated use of computers and information technology to cause severe disruption or widespread fear in society. As such, a simple propaganda in the Internet, that there will be bomb attacks during the holidays can be considered cyber terrorism.

Hacking. Hacking is the activity of breaking into a computer system to gain unauthorized access to information. The unauthorized revelation of passwords with intent to gain unauthorized access to private communication of a user is one of widely known computer crimes.

Cracking; It is where edit a program's source code, or you could create a program, like a key generator. It can be also be defined as **Crackers** are kind of bad people who break or violate the system or a computer remotely with bad intentions to harm the data and steal it Crackers destroy data by gaining unauthorized access to network.

Publishing; Publishing is the act of attempting to acquire sensitive information like usernames, passwords and credit card details by disguising as a trustworthy source. Publishing is carried out through emails or by luring the users to enter personal information through fake websites.

Cyber stalking; The use of communication technology, mainly the internet, to torture other individuals is known as cyber stalking. False accusations, transmission of threats and damage to date and equipment fall under the class of cyber stalking activities.

Computer industrial espionage this act involves the stealing of trade secrets or spying on persons though technological means for briery, blackmail or corporate/personal advantage.

Software piracy this is an act of copying software for distribution or personal use without the authority of the owner. Programs that are not protected with encryption keys (installation ID number), malware protection or other types of anti-piracy methods are easy to copy.
Phreaking: let is an act of getting into a communication system illegally, usually to make telephone calls without paying for them. Phreaking involves breaking involves breaking into and manipulating the phone company's computer system, making it specialized hacking.
Cyber extortion is a form of cyberterrorism in which a website e-mail server, or computer system is subjected to repeated denial of service or other attacks by malicious hackers, who demand money in return for promising to stop the attacks.
Cyber terrorism in general, can be defined as an act of terrorism committed through the use of cyberspace or computer resources.
Denial of-service attack. This is attack designed to render the system unusable. Attacks can deny service to individual victims such as deliberately entering a wrong password enough consecutive times to cause the victim account to be locked or they may overload the capabilities of a machine or network and block all users at once.
Eavesdropping is the act of secretly listening to private conversation, typically between hosts on network or telephone conversation. For example, programs such as **Carnivore** and **Narsingh** have been used by the **FBI** and **NSA** to eavesdrop on the system of internet services provider.
Spoofing. This involves hiding as a trusted system in order to gain unauthorized access to a secure environment. IP spoofing involves modifying data to make it appear to originate from the IP address of a system that is 6trusted by a server or firewall.
Man, in the middle attacks. Man-in-the-middle attacks are perhaps one of the more difficult and modern forms of security breaking approaches. As the name implies, such an attack involves the secret assignment of a software agent between the client and server ends of a communication.
How to control computer crime
Just like any sort of crime, common sense is your most valuable ally when dealing with cyber criminals, never open suspicious documents.

1. **Don't give out personal information** to open you don't know. And the wary when approached with a suspicious proposition.
2. **Learn about cybercrime** and talk to your family about how **to** identify scams. Never give out your personal information to anyone you don't know on the Web.
3. **Use a firewall** to protect your computer from hackers. Most security software comes with a firewall. Turn on the firewall that comes with your router as well.

4. **Purchase and install anti-virus software** such as McAfee or Norton Anti-virus. AVG offers free Anti-virus protection if you do not wish to purchase software.
5. **Shop only at secure websites.** Look for a Trustee or VeriSign seal when checking out. Never give your credit card information to a website that looks suspicious or to someone you don't know.
6. **Use strong passwords** on your accounts that are difficult to guess. Include both letters and numerals in your passwords. Never use a word that is easy to guess- - like your wife's name.

Keep watch over your children and how they use the internet. Install parental control software to limit where they can surf.

COMPUTER ETHICS AND INTEGRITY IN GENERAL

Computer Ethics. Computer Ethics are human values and moral conduct of computers users. OR computer Ethics refers to the right or wrong behavior exercised when using computers

Computer integrity refers to the loyalty or faithfulness to a set of laws about computer usage. Some common issues of computer ethics include intellectual property rights (such as copyrighted electronic content), privacy concerns, and how computers affect society. In 1991, the Computer Ethics Institute (CEI)held its first National Computer Ethics Conference in Washington, D.C. The Ten commandments of computer Ethics were first presented in Dr. Ramon C. Bruin's paper prepared for the conference, *"In pursuit of a 'Ten commandments 'for Computer Ethics."*

The Ten Commandments of Computer Ethics

These principles consider the effective code of conducts for the proper use of information technology. The Ten Commandments of computer ethics are:

1. You shall not use a computer to harm other people.
2. You shall not interfere with other people's computer work.
3. You shall not snoop around in other people's computer files.
4. You shall not use a computer to steal.
5. You shall not use a computer to bear false witness.
6. You shall not copy or use proprietary software for which you have not paid.
7. You shall not use other people's computer resources without authorization or proper compensation.
8. You shall not appropriate other people's intellectual output.
9. You shall think about the social consequences of the program you are writing or the system you are designing.

You shall always use a computer in ways that ensure consideration and respect for your fellow humans.

Unethical Computer Code of Conducts

With the advancement of ICT, it is easy for anyone to retrieve your information from the internet. You may not realize that when you fill a form on the internet, your information may be exposed and stolen.

Examples of unethical computer Code of Conducts include:

- Modifying certain information on the internet, affecting the accuracy of the information
- Selling information to other parties without the owner's permission.
- Using information without authorization.
- Involvement in stealing software
- Invasion of privacy

Ethical Computer code of conducts

Examples of ethical computer code of conducts include:

1. **Respect the privacy of others.** Do not in any way examine or change files or passwords belonging to others. Do not violate the privacy of individuals or organizations.
2. **Respect the integrity of computing systems.** Do not developer use programs that invade, damage, or alter computing systems or software. Do not in any way harass other users.
3. **Always Identify the user accurately.** Never use someone else's account. Do not use fraudulent means to avoid accounting for the use of computing services.
4. **Respect copyrights and licenses.** To copy a licensed computer program is illegal; it is indeed theft.
5. **Respect the intellectual property of others.** Individual programing assignments are expected to be done by individual students; do not take another's work or ideas to call your own.

Exhibit responsible, sensible use of computer hardware, software, and data.

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. It is a legal field that refers to creations of the mind such as musical, literary, and artistic works; inventions; and symbols, names, images, and designs used in commerce, including copyrights, trademarks, patents, and related rights. Under intellectual property law, the holder of one of these abstract "properties" has certain exclusive rights to the creative work, commercial symbol, or invention by which it is covered.

Essential Elements of Intellectual Property Rights

The Agreement provides for norms and standards in respect of following areas of intellectual property:

- Copyrights and related rights
- Trade secrets

- Trademarks for broad identity
- Geographical indicators
- Industrial designs
- Lay out designs of integrated circuits
- Patents for inventions
- Plant varieties

In general, these properties are termed as "Intellectual property". **Intellectual property** is an asset that can be bought or sold, licensed and exchanged. But of course, unlike other properties, intellectual property is intangible; rather it cannot be identified by its specific parameters. These properties are protected on a national basis.

Copy Rights

A copyright is a set of exclusive rights granted to the author or creator of an original work. This is for material, aesthetic material, literacy, music, film, sound recording, broad casting, software and multimedia. copyright is sanctioned to prevent others from:

a) Copying the work
b) Publishing and selling copies commercially
c) Renting or lending the work in a free market
d) Doing or demonstrating the work in public

The test for such originality consists of two conditions-(1) work must originate from the inventor and not a copy from others' works. And (2) the invention or work must have adequate amount of creativity.

Trade Marks

A trademark is an identification symbol which is used in the course of trade to enable the purchasing people (buyers) to distinguish one trader's goods from the similar goods of other traders. These marks also symbolize distinctly the quality of the products. These marks are in the form of certain 'wordings' or can be in the format of logos, designs, sounds, e t c. Examples: NIIT, Kodak.

Trade Secrets

A trade secret means information, which is kept confidential as a secret. This is generally not known in the relevant industry, offering an advantage to its owner over other competitors, for engineers, inventors, and designers, the trade secrets are to be maintained secretly. Such trade secrets include some formulae, programmers, methods, progresses or data collections etc.

EMERGING TECHNOLOGIES

The concept of emerging technologies involves the innovations and advancement in the use and discovery of new technological tools that make the use of technology more amazing and advanced.

Application areas of specific emerging technologies

1. **ARTIFICIAL INTELLIGENCE.** Artificial intelligence is the ability of computers to reason and think like human.

It is the ability of the computer to mimic human behaviors. Various tools of artificial intelligence are also being widely deployed in homeland security.

Application of artificial intelligence

Natural languages. Programming computers to understand human natural language.

Neural system. Systems that simulate intelligence by attempting to reproduce the types of physical connections that occur in animal brains.

Expert systems. Programming computers to make decision in real time situations e.g. Some expert systems help doctors to diagnose diseases based on symptoms.

Robotics. Programming a computer to see and hear and react to other sensory stimuli. Currently, no computer exhibits full artificial intelligence that is to say, are able to simulate human behavior.

Biometric systems. Programming computer to recognize and use natural senses from the biological parts of human body e.g. The thumb prints.

Voice recognition. Programming computer to understand and distinguish human voices.

Game playing. Programming computers to play games such as chess and checkers.

Computational creativity. Is the study and simulation by computational means of behavior, natural and artificial which would be observed in humans beamed creative.

- The goal of computational creativity is to model, simulate or replicate creativity using a computer, to achieve one of several ends.
- To construct a program or computer capable of human- level creativity.
- To better understand human creativity and to formulate an algorithmic perspective on creative behavior in humans.
- To design programs that can enhance human creativity without necessarily being creative themselves.

Computer vision. Is a field that includes methods for acquiring, processing, analyzing and understanding images and in general- dimensional data from the real world in order to produce numerical or symbolic information e.g. the forms of decisions.

Virtual Reality (VR). Is a term that applies to computer- simulated environments that can simulate physical presence in places in a real world as well as in imaginary worlds. Most current virtual reality environment are the primarily visual experiences, displayed either on a computer screen or through special stereoscopic displays.

1. **DIGITAL FORENSICS**

Digital forensics is a branch of forensic science encompassing recovery and investigation of material found in digital devices, often in relation to

computer crime, digital forensic investigations have a variety of applications.

Digital forensic process.

Digital forensic investigations consist of 3stages; acquisition, analysis and reporting.

1) **Acquisition.** It involves forensic duplicate of the media, often using a write blocking device to prevent modification of the original.
2) **Analysis stage.** An investigator discovers evidence material using a number of different methodologies and tools. The actual process of investigation can vary between investigations, but common methodologies include conducting key searches across the digital media recovering deleted files and extraction of registry information.
3) **Reporting.** When an investigation is complete the data is presented, usually in the form of written report.

Branches of digital forensic.

Digital forensic includes several sub-branches relating to the investigation of various types of devices.

1) Computer forensic the goal of computer forensic is to explain the current state of a digital artefact; such as computer system, storage medium and electronic document. Computer forensic can deal with abroad range of information.

Application of computer forensic.

- Investigate and uncover evidence of illegal activities conducted via a computer such as credit card fraud, intellectual property theft and computer system intrusion (hacking)
- Investigate and uncover evidence of crimes that weren't directly committed via a computer, but for which the accused might have stored evidence on the computer storage media.
- Detect and close the computer system security holes through "legal" hacking.
- Computer forensic experts are often called **"cyber cops", cyber investigators" or Digital detectives"**

Disadvantages of computer forensic

- **Privacy concern.** It may happen in some cases where the privacy of the clients is compromised. But in some circumstances, it becomes almost impossible for the computer forensics professional to maintain the secrecy of the data or the information.
- **It is also possible that some sensitive data or information** that is important to the clients may be lost in order to find the evidence. The forensics professionals must maintain the concern that data or information with the possible evidence is not destroyed.

- There are also chances of introducing some malicious programs in the computer system that may corrupt the data at a large stage of time.
- Physically extracted and relevant evidence may be destroyed or lost. The custody of the data is acquired as the evidence is the possibility of the computer forensics team.
- **Costs**. It is also possible in some cases that the operations costs may exceed. Steps should be taken to minimize the costs.
- **The maintenance costs.** The costs to maintain a laboratory containing appropriate computers, computer analysis tools, software and security implements to safeguard information can be enormous.
- **Data corruption.** A number of issues concerning the corruption of important data are necessary to note. In the process of carrying out computer forensics process, data may get corrupted.

2). 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. It differs from computer forensics in that mobile device will have inbuilt communication systems (e.g. GSM) and usually a storage mechanism. Investigation (SUMS)/Email) rather than in-depth recovery of deleted data.

3). Network forensics

Network forensics is concerned with the monitoring and analysis of computer network traffic, both local and WAN/internet, for the purpose of information gathering, evidence collection, intrusion detection.

4). Data forensics

Data forensics is a branch of digital forensic relating to the forensic study of data bases and their meta data. Investigation use data base contents, log files and in- RAM data to build a time-line or recover relevant information

CAREER IN THE ICT INDUSTRY.

People trained in the computer industry are bound to enjoy the widest availability of jobs as time goes on and the more varied a person's set of skills are the more likely he is to land well-paying and well satisfying career of his dreams.

1.3D animation or Graphic design specialist. A position where you design and create either a graphic or 3D animations for software programs, games, movies, web pages etc. Position may also require that you work on existing graphics, animations, and moviesetc, done by other people. If you wish to get into graphic design or arts, it is a must that you learn major graphics programs such as Adobe photoshop.

2.Repair and fix specialist. A job that requires you to fix and repair computer and replacing it with a good component.

3.Database specialist. A job that requires creating, texting and maintaining one or more database at the place of employment. For example, Ms. Access, Fox Pro, MySQL, SQL and Sybase.
4.Security expert. Test and find vulnerabilities in a system, hardware device or software program.
5.Electronics technician or engineer. Assembling, testing and repairing electronic equipment. This career needs a strong understanding of basic and advanced electronics, there is need to get formal education in electronics and electro-mechanical or self -teach by your own electronic system.
6.Hardware specialist. A career requires a hardware designer, circuit design, embedded system, firmware, etc. Is a job that requires you design and create a complete hardware package or portions of a hardware device.
7. Quality Assurance (QA), system analyst or tester. This career requires that the employee test out features of a product for any problem or usability issues.
8.Networking or system developer. Computer networking careers involve designing, setting up and maintaining a network.
Preparing for a career in ICT industry.
The road to a career in computing fields starts as early as possible. Individuals who are seriously interested and commited to pursuing a computer should begin while they are young and in high school and college. After college, the study of icts may even become a lifelong endeavor.
Ways one should prepare for an ict/it career

- **College/university preparation.**
  Most of the people working professionally in the ICT/IT industry possess an undergraduate degree at the vry least. These degrees encompass math's computer engineering, still others hold advanced degrees. For "A" level racists may purse some certificate course that are available at some institutes before joining the colleges, and these IT short courses include; certificates in a computer application and systems, professional graphics design and branding training , Website Design and Development, Mobile application development, Cisco certified network associations (CCNA) and others which may take 5-8 weeks, this may give you a very good foundation before joining college. The degree holders all have one trait before beginning their undergraduate studies.
- Students truly interested in computing careers should formulate a plan to apply to colleges that features computing degrees of interest and location that are convenient.
- Working together with industry professionals/industrial training. This is an effective way of getting students understand ICT

careers better because they make them learn its application practically.

- Club sponsorship. Find a computer science club or become a member of existing club.
- Internships. Look for work experiences (either volunteer or paid) at employment sites or observation during breaks.
- By carrying out field trips to areas where ICT/IT activities are being conducted for example in telecommunication companies.
- Student fairs. Participate in the local student's faire and other competitions in the career of computer to make you acquire the experience.

- Join organizations. Students that have interests in the career of IT should join organizations in order to get more experience and develop a familiarity with this career.

THE END OF A LEVEL