I.C.T. HAND BOOK

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This booklet covers the entire advanced Level Information Technology Syllabus. There has been a demand for a corresponding of ICT summarized resource that makes a student understand the intention of learning ICT.

The booklet has been designed for students who are preparing to sit for their course work, assessments and ***UNEB*** *final examinations. The material used in this booklet has been well researched on and edited by the author. The sources included:-the internet, textbooks, handouts, past papers and discussions conducted by ICT Scholars*

Extra Ordinary Efforts Bring, Extra Ordinary Results.

What is a computer?

A computer is a general purpose machine which can receive data, store and manipulate

(process) it and output information.

OR

It is an electronic machine which allows/accepts data input, process it under special instruction, stores, and outputs information

Characteristics of a modern computer

Speed: *Computers are very fast in their operations. Their speed is measured in MIPs*
Accuracy: *Computers hardly make mistakes. Mistakes committed by computers are mainly caused by the user. Hence the saying garbage in garbage out (GIGO). GIGO*
Storage: *Computers keep user data / information for future use.*
Diligence: *Computers work on the same task over and over without getting bored or tired*
Artificial intelligence: *computers accept instructions and respond accordingly.*
Automation: *Computers have the ability of working without human supervision.*
Versatility: *Computers have the ability of doing different/ multiple tasks.*
Communication: *Networked computers have the ability to send and receive messages.*
Adaptability*.Ability of computer to comply with different settings. For example, they can be used for home use, banking, communication, entertainment, space explorations, teaching*

Factors that should be considered when purchasing a computer

→*Hard disk capacity*
→*Processor speed and type*
→*RAM capacity*
→*State of a computer (whether new or old)*
→*Computer size (Whether it's a desktop or laptop)*
→*Technology used to make the monitor and its size (CRT or LCD)*

The table below gives specification details of two computers A and B.

Component	*Computer A*	*Computer B*
OS	*Windows XP*	*Ubuntu*
HDD	*10GB*	*4096MBs*
CPU	*2.4GHz*	*526MHz*
Network Type	*Cable-NIC*	*WIFI*
System Type	*32 bits OS*	*64 BIT OS*
Display	*HD-LCD*	*CRT*
RAM	*1024MBs*	*1GB*

i.Which one of the above computer would you recommend for your personal friend to buy?.. ***A because it has 64 bits OS word length*** *iii.Which computer type is good for multi-colour out* ***A because of 64 bits OS*** *iv.Which computer type is fast* ***B because it has 2.4 Ghz processor speed***
*v.Which computer type is good for UTP networking media?..****A because it has a NIC that supports use of cables that minimize environmental obstacles like wind or rain.***
*Which computer type is not disturbed by viruses?....****B.. because of Ubuntu which is virus resistant***
*Which computer type has the smallest hard disk space?.....****B……***

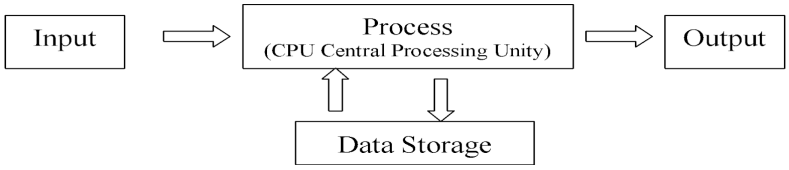
<u>THE CONCEPT OF INFORMATION PROCESSING</u>

Define the term information processing.
→Process of transferring data into a form which can be used to make better decision.

→The act of changing/converting data into more meaning format /information

The difference between data and information.
Data are raw facts entered into a computer while information is processed facts/data.
List one example of information.
Pay slips, report cards, invoices, executive summary

Describe the stages in the information processing cycle.
*→**Data collection, preparation and verifications** →Finding data from its sources, recording it on some media & organizing it in some order suitable for input*
*→ **Inputting**: entering data into the computer*
*→**Processing:** Manipulation/converting of data to get information*
*→**Outputting:** presentation of information to the user*
*→**Storage:** keeping of data temporary on RAM or in permanent format for future reference.*



Terminologies'
Computer engineer- *A person who designs and develops computer components*
Computer operator- *A person who enters data in the computer for processing*
Computer technician- *The person responsible for assembling electronic equipments.*
→Does the repair and maintenance of computer equipment
→Upgrade software in computer systems
Computer instructor- *The person responsible for training people on how to use computers and various application programs*
→Guides learners during research and advising them on best career opportunities
Systems administrator-*The person who designs, sets up and maintains a computer network*
→Monitors the use of network resources
→Trouble shoots network problems
Database administrator- *Creates, tests and maintains a database*
→Updates records in an information systems
Programmer- *Develops and maintains software programs*
→Develops and customizes software programs for large organization

Information communication technology.
→This is all types of equipment and programs used in processing information.
→The technology that handles information as well as aiding communication.
→The procedures and equipment used by people to improve the quality of gathering, processing, communicating and storing information.
Communication*: The transmitting of a message from one point to another or a sender to a*

receiver through several (physical or electronic) media.
***Technology**: The advanced scientific knowledge that eases work.*

How Information Communication Technology can be applied in schools. *→As teaching aid e.g. simulation of laboratory experiments. →Virtual Library where students can access books online.*
→Online research through use of Google scholar and other sites
→Student end of term report card generation
→Through online education
→Computer Assisted Assessment where teachers use computers to examine students.
→Through Computer aided learning where students do courses online.
.→School record keeping
→Use of software like word processors, spreadsheets which enable us to accomplish projects and other school activities
→Access to the internet and thousands of online databases
→The use interactive teaching packages available on CD for many different subjects
→Links with other schools or colleges for better knowledge sharing
→Students can work at their own pace, repeating sections they don't understand with the use of electronic materials
→Students can learn by themselves even when the teacher is away because the notes and other materials can be left online
→Immediate results or feedback is given when a question is answered the case of CAA
→There is rich educational resources on CD-ROMs and internet making textbooks cheaper
→The materials are presented in a consistent way, you are not dependent on the skills of a particular senior teacher.
→Few teachers may be required once learning using ICT has been instituted

Ways how Information Communication Technology can be of negative impact to your school.
→ Moral degradation through access of pornographic sites
→Eye strains in students due to prolonged usage.
→Consume a lot of power which is costly for schools.
→Maintenance and repair are expensive.
→Computer virus attacks lead to loss of data.
→Computers facilitate forgery of documents which cost organizations money.
→Computers put students and teachers privacy at risk due to the likelihood of hacking.

Ways how I T is used at home to enhance learning.
→Pay bills through the payment by phone services (PPS)
→Manage investments and family budgets related to education.
→Listen to educative music
→Watch educative movies and videos
→Play educative games
→Research and education
→Take college classes online (i.e., cyber classes)
→Produce assignment and reports
→Learn to speak a foreign language
→Help youngsters to read, write, count and spell
→Personal and business communications

→Organize names and addresses of academic friends
→Communicate with others around the world using e-mail and chat rooms
Internet access
→Access a wealth of information such as news, stock prices, and educational materials
→Shop for goods and services
→Communicate and exchange information with other people around the world
→Provide information to others (e.g., a home page)

How IT is of a disadvantage to learning.
→Face to face interaction between students and teachers may be reduced.
→The CAL package is predefined; you cannot change until the designer does
→Boring; sitting quietly in front of a computer screen since computers cannot motivate students like teachers
→The students will lose the skills of social interaction and become more isolated in their own little 'cyber world'
→Teachers will become redundant or unemployed

Impacts of ICT on the environment
→Some ICT are very hard to be disposed
→Industries have been created hence too much waste products that pollute the environment
→Too much noise from industries have killed the organize
→Well and advance machines are in place that can plan trees, water it
→Also machines have been introduced that can cut tress in just a second
→Improper disposal of computer metal leads to environmental degradation.
→Electromagnetic radiations from computer screens compromise human life.
→Due to too much power consumed by computers; many dams have been constructed which lead to environmental degradation.
→There is a lot of heat generated by computers which cause temperatures to rise in computer labs and working rooms.

<u>Impacts of ICT In The Following Sector</u>
Society/ethics
-They have improved communication through e-mails, Face book
-Enabled sharing of data and information between people in different areas by utilizing network service of emailing, and social media.
-Computers have self-check systems which have increased data accuracy, reliability and data integrity.
-Many forms of entertainment eg.online music and videos, games, sports, etc which reduce boredom
→The rate of accessing data and information in our society is now high due to use telecommunication where info can be accessed as it happens where ever it is
Health
-Cardiac pace makers have supported patients who have problems of the heart.
-Simulation has helped medicine students to have experiences of surgery and other operations without risking human life.
-With computers medicine has been discovered to cure mysterious diseases by use of internet.
-Internet has facilitated research and collaboration among doctors to cure diseases.

-X-ray machines and other computerized devices have helped in diagnosis of unknown sicknesses.
-DNA tests with the help of computers have helped to identify organism's true heritage

Economy

-ICT has created jobs for machine operators, technicians, data analysts, engineers, programmers and network administrators. This has improved the economy through taxation of such workers.
-Computers have reduced on paper work costs by storing a lot of data on computer other than costly files and paper.
-Electronic commerce (E-commerce) has made business across continents easy, simpler and cheap.
-Due to computers' accuracy and reliability, production of high quality and valuable products is guaranteed.
-Business transactions takes place 24/7 hence increased productivity

Politics

-Satellites and CCTV have improved security through monitoring and surveillance of suspected criminals.
-Drones have made it easy for missions in dangerous places for humans to reach.
-Internet has facilitated communication and commanding of operations even when one is not on the ground.
-ICT has facilitated printing of ballot papers, monitoring of elections, counting and declaration of results of a given election.

Disadvantages / Negative Implications Of Using Ict To:

Society / ethics

-Pornography: The influx of immoral pictures and videos on the internet has attracted children into watching them who end up being addicted.
-Culture deformation: Due to exposure to ill acts of girl-boy relationship online, youth end up in defilement and rape.
-Internet promotes inhuman practices of homosexuality since homosexuals use it to entice the young into the practice.
-People have become lazy and dependants of computers to the extent that some people can't do anything without the help of computers.
-There is a lot of kidnap as a result of relationships created online.

Health

-Wrist pain: This is as a result of prolonged computer usage.
-Back pain: This is a result of over sitting that leads to deformation of the spinal and subsequent poor sitting posture.
-People have had eye defects due to radiations from computer screens after a long use.
-Eye strain due to much light from computer screens.
-Headache. This is common with programmers because of engaging the brain to fix errors.
-Irritable desk syndrome: this is a syndrome caused by poor ergonomics/ working environment.

Economy

-Cost: Computers consume a lot of power which increases power bills.
-Unemployment: many messengers, postmen and copy typists have lost their jobs because their work is better done by computers.
-Maintenance: Computers are expensive to service and repair.

-Los of data: virus has caused organizations to lose a lot of data which leads to sabotage of operations. -Forgery: Because of computers the rate of forgery has increased and organizations have lost huge sums of money through false pretence.

Politics

-Personal security has been jeopardized by hackers who obtain people's private nformation and use it for wrong deals.
-Internet provides an efficient platform for rebel group's collaboration and recruitments.
-Government secrets have landed in the hands of the enemies because of hacking.
-There has been invention of mass destructive weapons which lead to indiscriminate killing.

Environment

-Improper disposal of computer metal leads to environmental degradation.
-Electromagnetic radiations from computer screens compromise human life.
-Due to too much power consumed by computers; many dams have been constructed which lead to environmental degradation.
-There is a lot of heat generated by computers which cause temperatures to rise in computer labs and working rooms.

ICT related professions learners of ICT can opt for.

- *Computer hardware technicians*
- *Software engineers/programmers*
- *Computer lab attendants*
- *Network administrators*
- *System analysts/consultants*
- *ICT instructors and teachers*
- *ICT based secretaries*

Areas of self-employment that a qualified ICT person can engage in

Running a café
Sales and distributing of ICT items and software
Training users on how to use ICT systems
Offering support
Graphic designing
Computer technicians
Computer engineer
Computer operator
Computer technician
Computer instructor
Systems administrator
Database administrator.
Programme

USES OF COMPUTERS

They are used in our everyday life in various tasks. The following are some of the areas where ict /computers are widely used

Education:

- *Computers are used for long distance learning were a student interacts with a teacher via the computer. It is called E-learning (electronic learning*
- *Can be used to help students learn a new subject on their own through* ***Computer Aided Instructions*** ***(CAI)***
- *students use computer software to learn at their own pace (speed) and answer questions through* ***Computer Assisted Learning*** ***(CAL)***
- *Teachers can use computers to mark and assess the students' performance through* ***Computer Assisted Assessment (CAA).*** *This has reduces the time and labour spent marking the students' scripts*

- *Electronic Library (e-library) to search for books, borrowing and returning them.*
- *Through telecommunication one can registers, attend lectures and graduate at home.*
- *Notes and tests are easily shared among students and teachers through use of the internet.*
- *They are used to carry out educational research on every topic from the internet.*
- *School Management Systems are used to manage records and generate student report*

Health

- *Keep patient records*
- *Robotics are now days used to carry out surgery that requires a lot of precision*
- *Used to develop colorful graphic scans that can show the affected parts of the body*
- *They are used to carry out medical research which has brought about new medicines.*
- *They are used to develop colorful graphic scans that clearly show human anatomy.*
- *They are used to make the diagnosis of the disease and prescribe the medicine.*
- *Computers are used to run machines that reduce people's weight and in meal analysis.*
- *They are used in hospital to design forms, monitor the sick and diagnosis.*
- *They are used for medical collaboration through telecommunication.*

Entertainment

- *Watch movies*
- *Play video games. Need for speed*
- *Used to make airline schedules and hotel reservation*
- *Recording and playing music both video /audio*
- *Computers are used to analyze and create beautiful musical sounds and tones.*
- *Novels and all kinds of pleasure reading can be downloaded and played on internet.*
- *They are used to enhance Images through photo editing and touch up.*

Security

- *Guiding missiles in a war zone*
- *Military computer based training*
- *Computer simulations allows the military to train solders for several combat situation*
- *Use of closed circuit TV camera*

Industrial / manufacturing:-

- *Quality control*
- *Robots are being used to handle tasks, which cannot be efficiently handled by humans.(In many large manufacturing and production processes)*
- *Computer Aided Design (CAD) and CAM (Computer Aided Manufacture) are also in this category*

Sports:

- *To analyze the smallest movements made by the athletes*
- *The idea of goal-line technology, shorts on target, number of touches the individual player gets on the ball, ball possessed on either side per minute time*
- *Used by experts to pin point wasted energy and movements for many athletic events. This brings about improvement in performance*
- *Play backs by computers have helped players to realize their mistakes and improve.*

- *Specialized computers e.g. computerennis, records plays and help player improve.*
- *They are used to broadcast sports live events like live matches on Sky sports and DSTV.*

Homes.

- *Can be used to entertain, educate, keep track of your personal budget, plan meals and determine what food items to buy in a week.*
- *Many banks now offer home banking. You can make transfers, deposits and withdrawals with ease from the comfort of one's home.*
- *One can use the computer to register for a course, attend lectures at home and possibly graduate at home. This can be done through teleconferencing*
- *Keep home picture and documents*
- *Learners can do their home work at home using computer/consult by calling their class mates and subject teachers*
- *Through telecommunication one can registers, attend lectures and graduate at home.*
- *Through use of Face book and what's app one can communicate with friends and relatives.*
- *Security: Computers can be automated to sense smoke, water leakage and call the police.*

Office automation.

- *Accurate and neat documents are created and stored through use of word processors.*
- *E-mail facilitates instant and efficient transmission of messages despite the distance.*
- *Offices use telephones to dial computers, instruct workers and store messages.*
- *Facsimile is used to transmit graphic and alpha-numeric data from one place to another. .*
- *Telecommunication enables faster transmission of messages compared to traditional method.*
- *Local Area Networks (LAN) facilitate sharing of files and peripheral devices instead of buying new equipment.*

Government and Military.

→To design conventional and modern weapons like drones and warships
→To analyze satellite information which can help the government to seek and destroy their enemies using warships and planes
→In teleconferencing whereby different offices in different areas can meet together by the help of computers.
→Politicians to solicit (look for) for support through SMS and websites
→Electoral commission to carry out electronic voter registration, designing voters' cards, and tallying (counting) of votes

Business

They are used to automate vending machines, elevators, cars, and phones.
They are used to keep business documents in electronic which reduce costs.
They are used in banks to transfer money electronically which eases banking.
They are used in banks to work as tellers thus reducing bank congestion.
They are used for business communication through emails and telephone.
They are used to carry out business data processing e.g. computing daily sales
They are used to design receipts, bills, invoices and other business document.
They are used in advertisement of business products on TV, Radios, internet
They are used to count huge sums of money in banks and supermarket.

Dangers Of Using Computers In Business

→Initial investment cost can be high (setting up)

→Some jobs may be lost due to compute computerization and thus lower the morale of staff member
→Some staff has/have to be trained or retrained
→Easier transmission of virus via the internet, which may lead to creating untimely cost to the recipient and sender computer
→Computer load personal information, which may be misused
→Problems may arise when computers cannot be used either because they are malfunctioning or damaged.
→This can bring an organization to a half if no backup exists
→Security has be provided to protect personnel and staff from preying eyes.

***Science and Engineering**:*
They are used to carry out millions of complex calculations at required levels of speed and accuracy.
Computers are used by astronomers to test physics theories and make accurate conclusions.
Computers are used in forecasting complicated weather patterns
They are also used in processing and enhancing images or pictures (image processing).

CATEGORIES AND CLASSIFICATION OF COMPUTERS

Modern computers fall into various categories. These categories are classified in the following ways:-

- *Classification by size/capacity.*
- *Classification by process/function.*
- *Classification by purpose.*
- *Classification by Processor Power*

Classification by Size (physical size)

- *Super computers or Monster computers*
- *Mainframe computers.*
- *Mini computers.*
- *Micro computers*

(i) Super computer (Monster computers).*Weather forecasting, Space exploratory* ***Characteristics***
These are the biggest of all computers.
They have high mathematical capacity and they are used for complex calculations.
They are the most expensive in price
Is the fastest and more powerful in all computers and can process trillions of instructions in few seconds.
Support over 1000 users (peripherals) at a time
(ii) Mainframe computers
These are the second largest in physical size after monster
They are used by governments, big companies and banks.
They support a wide range of peripherals btn (500-1000).Each user works separately with a separate keyboard and monitor but they all use the same processor Central Processing Unit)
Mainframe computers generally require special attention and are kept in a controlled atmosphere.
Specially trained operators and programmers are required for its operation.
iii).Mini computers.
They possess the same working principles as the mainframe except that are a bit smaller. Users range from 50-500 at a time.
They are mostly used in medium sized organizations.
These are smaller than mainframe computers.
They can be used by 50-500 users a time.
They have a high storage capacity but lower than mainframe computers.

They have high processing speed but lower than mainframe computers.

(iv) Microcomputers. PCs (Personal Computer)

Microcomputers are smaller than mini computers and are a single user capacity.
They are mostly used computers in day-to-day work.
These are the smallest computers in physical size.
They have a high processing speed
They have a low storage capacity compared to the others

They consume less power
They are easily portable hence suitable for mobile computing

Examples of microcomputers include:

Desktop computers (PC)
Tower computers (PC)
Laptop
Palmtop
Note books
PDAs (Personal Digital Assistant

Laptop: *These are designed for mobile computing.*

Characteristics

- They are portable due to their size.
- Have limited support of peripheral devices.
- Fast in processing information

Palmtops: These are hand held devices. They can fit in the palm of a hand, hence the name.

PDA (Personal Digital Assistant). *These are hand held devices. Can fit in a shirt pocket and at any time, one can check e-mail; take a few notes, etc.*
They are designed for persons who are ever on move.

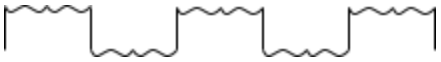
Notebook computers *– it is small in size and low weight and can be carried anywhere.*

Classification by Function/Process

They are classified according to how they process and present data.
Digital computers
Analog computers
Hybrid computers

(i) Digital computers

Digital computers process and present data in form of discrete values.like 1, 2, 3 … they don't present decimals or fractions. Examples of digital computers include pocket calculators, digital watches, etc.



Digital signals

Analog

Analog computers process and present data in form of continuous measurable quantities/units. They usually measure the quantities of nature like pressure, temperature, volume and weight. Examples of Analog computers include thermometers, voltmeters, speedometer, barometers etc.

Analog signals

(iii) Hybrid*These are computers which process and present data in form of discrete values as well as continuous measurable quantities. They possess the characteristics of Digital and Analog computers. All modern micro computers are hybrid. (Laptops, tablets, desktop computers)*

Classification by Purpose

- *Special purpose machine.*
- *General purpose computer.*

(i) Special Purpose Computers*They are designed to handle only a specific task(s). Their form of operation is restricted in nature, e.g. digital watches, pocket calculators and robotics*

*A **ROBOT**: Is a computer-controlled device that can move and react to feedback from the outside world-Programmable computer machine some time designed in human shape like to perform work ordinarily done by a human beings-A computerized remote controlled machine that mimic/assume human intelligence*

Application areas of robots

→Car assembling
→Bomb detection
→Inside dangerous chemical areas
→In military operations which may seem to be risky
→Fire fighting
→Tasks that requires repetitiveness and precision
→Repetitive
→Lifting heavy equipment
→high degrees of precision

(ii) General Purpose Computers

Designed to solve a wide range of problems, they perform a variety of tasks by means of specially written programs. These can perform calculations, keep date and time, process documents, store databases, etc.

Classification by Processor Power

Due to the rapid change in technology, processor power has also increased and the computers are getting faster and faster. The higher the processors power the faster the computer.

This, computers are classified according to the speed with which a computer responds to the user requests.

The categories under this classification include;

80286 or 286
80386 or 386
80486 or 486
Pentium I (80586)
Pentium II or Pentium Pro
Pentium III
Pentium IV
Core Processor

Define the term computer literacy.

→The ability to comfortable use the computer and its associated accessories.
→The knowledge and ability to use computer and related technology efficiently
→Comfort level someone has with using computer program and other applications that are associated with computers

Digital divide
*The**gap** that exists between the technologically advanced and the technologically backward*

Define A Computer Laboratory.
A special room where computers are kept efficiently for learning

Factors to consider when setting up a computer lab
↔*Availability of power*
↔*Well ventilated room*
↔*Availability of firefighting equipment Lab physical security*
↔*The room should be away from dust roads*
↔*Availability of enough capital*
↔*Number of computers to be accommodated (size)*
↔*Lab should be established in a safe place free of dust (location)*
↔*Purpose of the lab*
↔*Budget*

***Ergonomics** refers to minimizing injury or discomfort while using the computer*
Steps to follow:
→*Position monitor correctly*
→*Use adjustable chair*
→*Assume proper position while typing*
→*Take a break*
→*Ensure adequate lighting*

Identify five health hazards associated with the prolong use of computers (5mks)
→*Headache*
→*Wrist pain*
→*Cancer due to electromagnetic radiations*
→*Neck pain*
→*Back pain*
→*Eye strain*
→*Fatigue*
→*Stress*

Ways of preventing health effects of computers.
→*Always take a break to avoid fatigue*
→*Use a rotating chair to avoid back pain*
→*Use a anti-glare screen/or reduce a light on your screen/or use LCD to avoid eye strain*
→*Position your monitor proportionally to eyes to avoid neck pain*
→*Assume proper position when typing*

Ways you can ensure safety of computers in a lab/ computer lab security.. →*Installation of detective alarms and buzzers*
→*Employing security personal to guard the computer lab physically 24 hours*
→*Rules and regulations*
→*Make sure that all the computers lab equipment such as computer and other assets are locked down through cabling or other means to enhance physical security.*
→*IT labs are monitored either in person by lab technician, remotely through security cameras or a combination of the two*
. →*If possible, equipments should be placed to limited access*
→*All PC should be physically checked for unauthorized hardware devices on a periodic basis.*
→*Use of strong padlock and keys*

→ *Installation of burglar proofs e.g. metallic doors etc*
→ *Deployment of security guards*
→ *Installation of closed circuits camera*
→ *Installation of detective alarms and buzzers*
→ *Building of perimeter walls*

Measures you would take to control physical access into computer installation

→ *Lock and key*
→ *Burglar proofs*
→ *Alarm systems*
→ *Physical armed security personnel*
→ *Processed devices for identification*
→ *Biometric devices*

QN.Kadaga, wants to open up a computer laboratory at his school, identify 6 safety precautions that Kadaga should strictly observe.

↔ *Install fire extinguishers*
↔ *Install burglar proofs*
↔ *Ensure stable source of power*
↔ *Ensure proper laying of cables.*
↔ *Put rules to guide users*
↔ *Install fans/ cooling systems*

b).Identify any 18 Computer lab rules

→ *Switch off computers after use.*
→ *Scan external storage devices before using them.*
→ *Avoid playing free games in the computer lab since they may contain viruses.*
→ *Scan suspicious mails before opening them.*
→ *Avoid opening unknown mails.*
→ *Never fix computer cables by yourself.*
→ *Bags and pullovers should be left outside the computer lab to avoid loss of small computer components by the computer learners*
→ *The computer users should switch on and off computers in a proper way to avoid damages*
→ *Food stuffs and drinks should not be brought in the computer lab to avoid pour*
→ *The devices positions should be maintained and learners should avoid un necessary disconnections to avoid short Circuit*
→ *Physically, be careful, avoid knocking and dropping any hardware to the ground as this could cause any of the delicate components to break or be damaged and stop working*
→ *Proper shut down of computer should be followed to avoid disk and system failure so avoid abrupt switching off*
→ *Do not open metallic cover of computer or peripheral devices particularly when the computers power is on to avoid system Circuit*
→ *Keep fire sources out and far from the computer lab*
→ *Removable storage devices should be scanned before opening them in computers to avoid viruses*
→ *Avoid running in the lab because wires can trap you and fall down*
→ *Scan suspicious mails before opening them and avoid opening unknown mails*
→ *Do not bring in magnetic material/object to avoid easing of data on some magnetic disks*

<u>Importance of the following computer lab equipment.</u>

Air conditioner

-Modify the condition of air in the lab such as cooling
-Regulate dust accumulation in the lab
-To provide a conducive room temperature for users.
-To regulate dust accumulation in a computer laboratory.
-To dispel insects that could cause harm to the computers.
-To dispel bad smell from users

Wool carpet
-Absorb dust
-Reduce effects of damages when light objects fall
-Minimize effects of electric shocks
-Absorb electrical radiations from computer devices
-Provides a non-glare surface that reduce reflection and eyestrain
-Better insulation
-Reduce noise
-Prevent slips and falls when falls do happen, chances of injury are greatly reduced on soft flooring.

Computer dust cover
Prevent dust from reaching the hardware components of the computer system and also protect the computer moisture and dust

Anti glare screens
Prevent eye strain and fatigue caused by over bright monitor
To also reduce electromagnetic rays from CRT monitors

Blower
To remove dust accumulation from hardware components and system units

Surge protector like ***Voltage stabilizers:*** *helps to regulate the level of voltage/electricity that enters computer and other devices in lab so that electricity does not affect our computer.*

Un interruptible power supply (UPS)
-Protects the computer from sudden power loss
-Power backup that provides alternative source of power in case of power blackout
-It regulates the amount of power use by the computer
-Temporary power storage unit for the computer incase of power blackout.

NB.A surge protector: *only protects a computer from high voltage while* ***UPS*** *protects the computer from sudden power loss/temporary power loss unit for the computer in case of power blackout*

Gaseous fire extinguisher
Put off fire in case of an outbreak

Water proof covers
To prevent water from reaching the main parts of computer system
Protects the computers from moisture and liquid substance

Security cameras*: You can install security cameras (closed circuit television -CCTV) which can help you inspect the place to avoid people that many need to move out with some gadgets*

Alarms and buzzers*: are devices that can be attached on computer and if someone touches on the device, the buzzer or alarm will make sound*

First aid boxes*: there is a need to put these boxes in place so that in case of a danger, the victim is helped early. In the first aid box you can put bandages, eye pads, pair of gloves, dressings, safety pins, plasters and some others*

Others:

- ***Form*** *– for cleaning duty monitors, keyboards and system units*
- ***Software kit*** *– for reinstalling or repairing applications and virus detection and cleaning.*
- ***Masking tape*** *– for labeling devices accordingly*
- ***External drive*** *– just in case one does not work properly.*

Ways you ensure safety of computer hardware in a lab

- *use passwords*
- *Activating firewalls*
- *Locking hardware devices on tables using hardware locks*
- *Frequently dust blowing the computer*
- *Providing stable power supply*
- *Installation lightening arrestors on the computer room*
- *The lab should be well laid out with enough space for movement of user*
- *Cables and power sockets should be well insulated*
- *Power cables should be of a correct rating to a void short circuits*
- *Maintaining of entry and exit user log.(to record users that have used a particular computer to monitor crime committed)*

Ways of ensuring continuous use of a computer

- *By regularly servicing the computer*
- *By upgrading computer software*
- *By updating computer software*
- *By covering a computer to a void dust from entering a computer*
- *By use of air conditioner facility*
- *By training workers into better methods of using the computer facilities*
- *By employing trained personnel to help in areas of computer use difficulties*
- *Install an antivirus program to reduce damages caused by viruses onto hardware*
- *By implementing physical access guidelines to users*
- *Penalize user who intend to vandalize computers*

BOOTING AS USED IN ICT.

→Starting or restarting a computer and it loads operating system into its memory (RAM)
They are two types of booting: Cold booting and warm booting
Cold*: Starting a computer which was initially off /initial starting/powering of a computer after it has been powered off completely WHILE.* ***Warm*** *booting is re-starting a computer*

Initial procedure of powering a computer system

→First make sure you have a stable power source
→Make sure all the components are well and firmly connected
→Switch on the mains power source
→Switch on the stabilizer/UPS (in case you have one)
→Switch one the system unit because most of the parts including the power supply unit are in it.→Switch on the monitor reason being that what it displays comes from the system unit.

The first 4 correct order of shutting down a computer

Step 1: *Close all applications (Active window)*
Step 2*: Click on the start button &then click on shut down or turn off computer.*
Step 3: *Select the options shut down or turn off and ok or yes.*
Step 4: *Finally switch off the system unit and monitor*
*.**N.B**: If your computer does not turn off automatically a message appears when you can safely turn off your computer.*

Dangers of improper shutting down your computer
Crashing of hard disk
Loss of data
Corruption of files

NB.The use of RAM in relation to booting
Provides storage of the kernel that is loaded into RAM to enable the computer to boot.

Reasons for restarting a computer. (For carrying out warm booting)
→When you have installed a new hardware
→After installing software
→After changing CMOS or BIOS setup
→When the computer freeze or locks
→After uninstalling a software program.
→When the computer slows down.
→When a computer has a virus, it can constantly restart itself

Give three ways <u>HOW</u> one can be re-start a computer
→Chose start >shut down >restart.
→Pressing CTRL+ALT+DEL twice
→Pressing the computer reset button

The booting sequence is divided into two
→Front end booting stages
→Back end booting stages

Front end booting stages *are those done by the computer user. They are also regarded as proper ways of starting up a computer and it includes*
→Ensuring proper power cable connection to computer
→Switching on the main switch
→Switching on the monitor
→Powering the system unit by pressing the power button.

Back end processes *take place within the computer after the user has pressed the power button on the computers system unit. They involve the following*

*→**POST**: This is first instruction to execute.*
It checks the PC components and ensures that everything works

→***BIOS****: This resides in ROM.*
At this stage the computer is checked to establish whether basic input and output devices necessary for the startup are available.

→***Boot Loader****: This handles loading the operating system into memory and then passes control of execution to the operating system*

→*Finally the computer starts*

Note*: generally if asked to mention processes involved in booting a computer without the question specifying front end (for human) or back end (for the computer) then a student is supposed to give the following*

→*Switch on the computer mains*
→*Switch on the computer from the power button*
→***POST****: This is first instruction to execute.*
It checks the PC components and ensures that everything works
→***BIOS****: This resides in ROM.*
At this stage the computer is checked to establish whether basic input and output devices necessary for the startup are available.
→***Boot Loader****: This handles loading the operating system into memory and then passes control of execution to the operating system*
→*Finally the computer starts*

Forms of disaster that can befall computer systems and installations.

→*Fire out breaks*
→*Water from leaking roofs*
→*Lightening*
→*Acts of terrorism*
→*Robbery*
→*Collapsing buildings and tables*

Way system failure can be controlled.

- *Frequent backup of data.*
- *Installation of UPS.*
- *Installation of firefighting gadgets.*
- *Replacing old hardware with new hardware.*
- *Use of power regulators.*
- *Use of surge protectors.*

Computer trouble shooting. *→This is a form of problem solving often applied on repairing of failed product or processor.* *→The process of identifying and fixing a computer problem with hardware, software and many other products*

Common examples of computer errors/ problems include:
Freezing , Hanging , Computer restarting

Ways how you can troubleshoot a computer that has failed to start.
→*Restarting the computer*
→*Re fixing power cables*
→*Change of RAM chips*

→*Checking the power voltages.*
→*Blowing the CPU and RAM slots*

The computer failing to complete the booting process. This can be overcome by
→*Restarting the computer*
→*Re fixing power cables*
→*Changing of RAM chips*
→*Ensure there is required power voltage.*
→*Blowing the CPU and RAM slots.→Ensure proper cable connections.*

Programs not responding. This can be fixed by:
→*Restarting the computer*
→*Using the task manager to start the program*
→*Refresh the computer*
→*Scanning the computer for viruses*
→*Re install corrupted files in the program.*

Importance of Servicing and maintaining a computer
→*To prevent data loss*
→*To extend computer life span by protecting both hardware and software*
→*To increase its operation speed*
→*To remove bugs*
→*To prolong the life time of hardware*
→*To repair computer components with mechanical faults*
→*To update outdated software programs such as Antivirus*
→*To cut down costs involved in buying new equipments*
→*No interruption prevents damage of equipment-UPS*

Tools one needs to service a personal computer
Antivirus BlowersUtility programBackup CD

Methods you can use to enhance/improve the speed of a computer
- *Increase on RAM capacity*
- *Delete unnecessary files and folders*
- *Clean the system off viruses*
- *Re-install the operating system*
- *Do no install a too heavy anti-virus utility*

<u>THE CONCEPTS OF GREEN COMPUTING</u>
→*Environmental responsible use of computer*
→*This is the use of ICT in line with environmental conservation.*
→*The environmentally responsible use of computer and related resources.*

The following are some of the ways in which we can use ICTs without affecting the environment negatively:

Reduce or use noise proofs to avoid polluting the environment because noise can kill some organisms

Recycle the old ICT devices like old monitors, printers, radios and others to make new ones
*(**Green disposal:**i.e. Re-making an existing computer or appropriately disposing of ,or recycling unwanted electronic equipment)*
Do not use ICTs to make hazardous materials that can kill environmental components
***Green manufacturing:**i.e.minimizing waste during the manufacturing of computers and other subsystems to reduce the environmental impact of these activities)*
Use monitors that produce less or no radiation (LCD or Gas plasma)
***Green use:**i.e minimizing the electricity consumption of computers and their peripheral devices*
***Green design:** I.e. designing energy –efficient computers, servers, printers, projectors and other digital devices*
do not leave the computer running overnight
turn off the monitor, printer and other devices when not in use
use paperless methods to communicate

Green computing approaches

Use of Cloud computing
Use of LCD monitors
Use of Smart phones
Proper disposal of hardware
Use of Laptops with batteries

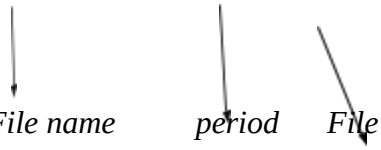
Advantages of green computing
Care for the environment
Responsible computing
Responsible installation, utilization and disposal of ICTs

Toxic substance from computer components
MercuryLeadChromiumCadmiumArsenicZincBarium

INTRODUCTION TO FILE MANAGEMENT
***File management:** is the system that an Operating Systems program use to organize and keep track of files*
***File format:** Is a standard way that information is encoded for storage in a computer file*
***Folder/directory .**A storage location for related files and sub-folders*
*→**A** collection of files and sub-folder stored as a group given a unique name*
→This is a virtual container for files and other folders called sub-folder
Folder can be divided into small units called subfolders. Therefore a folder in another folder (folder inside a folder)
***A file** is a collection of related data or information stored in one location and given a unique name (**called the filename**) for ease of access.*
Every file is made up of two parts/details/features:
i).A unique name (file name) and an optional extension (a file extension) separated by a period (.) a dot
The name and extension are separated by a period (.) eg. JUNE .DOC
In this case the file name is June and the extension is .DOC.

File extension*: is a part of (suffix) at the end of a filename which identifies the type of file it is*
→A file extension is the end part of a file name that is separated by a dot, containing characters based on the program used to create the file
→Enables one to know the program used to create the file
→Helps the computer select a an application to open a file
*→**In other words;** It identifies what program to associate the file with and how to properly open it using the correct program*
→The extension helps to identify the file type.

Assignment . Doc



File name period File Extension

EXAMPLES OFPROGRAMS AND THEIR FILE EXTENSIONS

Ms Word	*.doc/dox*
Batch file	*.bat*
Executable file	*.exe*
Text file	*.txt*
Ms Excel	*.xls*
PowerPoint	*ppt*
Publisher	*.pub*
Image files	*.jpg*
Sound files	*.mp3*
Video song.	*. Mpeg*
Rich text format	*.rtf*
Portable doc format	*.pdf*
Systems file	*.sys*
Portable network graphic	*.png*

Two Types of files
System file.*Is an executable file (in machine language) that is part of the operating system or other control program that contains critical files need for the smooth running of the operating system?**Application files.**Also called program files these are word that hold application program data or direction .e.g. doc file is an application file for Microsoft application*

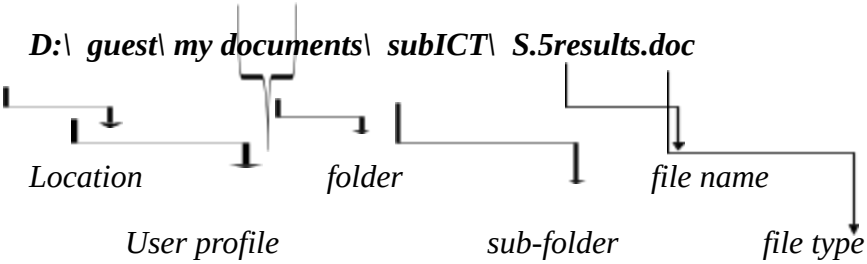
***NB**.In graphical user interface such as **windows** and the **Macintosh** a folder is an **object** while in **DOS** and **UNIX** worlds; a folder is called a **directory Directory-**This arranges related files together for quicker access*

Mention two ways a file is kept secure in a computer.

→By installing a latest copy of an anti virus program.→By encrypting files.→By limiting physical use of computer facility to users.→By backing up files regularly. →By avoiding the usage of old storage devices.→By sensitizing users about the need to keep files secure. →By punishing offenders that change files.→By applying keeping a log of users to monitor their activities.
→By pass wording files
→By avoiding the usage of old storage devices

File Path
Is an address which can direct someone where a certain file is locatedCan also consist of location of file .user profile, folder, subfolder(s) file name and file type.

D:\ guest\ my documents\ subICT\ S.5results.doc



Location folder file name

User profile sub-folder file type (extension)

*Another example is of **MP3file** named AZONTO in a folder audio located on the desktop on local disk **C***

We can write the path or address as follows
C:\user\desktop\audio\azonto.mp3
Types is ⟵ mp3
File name is ⟵ a zonto
Folder is ⟵ audio
Location ⟵ desktop
Profile is ⟵ a user
Storage on a drive ⟵ c

C;\admistrator\picture\sunset.IPG *C Hard disk partition\location on which it is saved ⟵ Admin profit of the person who created the file Picture folder that contain the file sunset.JPGSunset file name*
JPG ⟵ file format

.D:\ Guest\ My Documents\ Notes\S.6mid\ Paper One.Pdf*i.Name the storage device location where the file is stored…**partitioned D***
*ii.Which program was used to create a document?...**portable format (pdf)…….***
*iii.What is the name of the file that is open?.....**.....paper one……..***
*iv.Mention the folder where the file is stored.……**notes……**v.What is my document representing in this path?....**area/place where you can find/get your folder….**vii.What is S.6 representing in this path?.....**sub-folder…….**viii.Guest means that.……**profile/privilege (user account of the person who***

designed a text) *xv.suppose instead of* ***D:*** *was* ***C:\\,*** *what would be the area location where we can get/find our document* ***?It would be on the desktop***

A DRIVE: *Device that reads from and writes to disc. A drive is a slot or an opening where a storage device or disk is inserted*
Various media for storage have their representative drives in which they are contained during read or write process. These disk/tape drives and are represented by letters of the alphabet followed by a colon.(:)
DRIVERS: *Operating Systems recognizes storage median or devices as (drives) and may be given labels such as letter A-Z to identify them*

Drive Name	***Drive Letter***
3.5" Floppy Drive	*A :*
5.25" Floppy Drive	*B:*
Hard disk (non movable)	*C:*
(CD-ROM drive) system drives (normally network drives non-movable)	*D:*
Others (Flash disk,Tapes etc.	*E:-Z:*

Note: *In some instances, the hard disk is partitioned into several parts. This means that the drive letter for the CD will be changed. For example, if my hard disk is partitioned into two, one part will be labeled C: and another D: thus making the CD-ROM drive E: and the other will start from F-Z:*

Icon *Is a picture on a screen that represents a specific file, directory, hardware resource, program,etc****Common examples of an icon***
→*My computer*
→*Recycle bin*
→*My network places*
→*My documents*
→*All programs installed like……?* ***Desktop:*** *This is the first screen that displays after the computer has fully booted****Wall paper:*** *This is the background of one's desktop. It is always a picture* ***A Screen Saver*** *is a utility that causes the monitor's screen to display a moving image or blank screen if no keyboard or mouse activity occurs for a specified time period.*
*The screen saver starts playing on the screen if the computer is left idle for a set period of time.****Applications of a Screen Saver Program***
→*They were originally developed to prevent a problem called ghosting, in which images could be permanently etched on a monitor's screen.*
→*Screen savers can also be used for reasons of security.*
→*Prevents unwanted onlookers from accessing information or data from your computer.*
→*Business- advertisements on the screen.*
→*Entertainment – digital photos can be put on screen as moving pictures.*
→*The screen saver is used to prevent screen burn out /in.*
→*Used to display system status information*

Elements that can display on the desktop screen of a normal working computer
→*Icon*
→*The start button*

→ *Task bar*
→ *Notification area*
→ *Windows desktop background*

THE COMPUTER SYSTEM?

A computer system refers to the hardware, software, data and data processing personnel. ***OR***

A computer system refers to the co-ordination that is required between the hardware, software and human ware to produce and to enable the computer to produce work or perform the required tasks

COMPONENTS OF A COMPUTER SYSTEM

The components of a computer system are divided into 4 categories:-

- *Hardware*
- *Software*
- *Human ware (Data Processing Personnel)*
- *Data*

HARDWARE COMPONENTS OR COMPUTER HARDWARE

- *Hardware components of a computer system are the physical parts of the computer system.*
- *- These are physical components of a computer that one can touch, feel and weigh. Example; monitor/screen, keyboard, mouse, system unit etc.*

The computer hardware components are categorized according to the functions they perform, and according to the way they are connected.

Those that are categorized according to the way how they are connected are called ***peripheral devices*** *and* ***system unit*** *hardware*

Peripheral devices *they are connected to the system unit from outside externally*
While ***System Unit*** *hardware are inside the system box/unit and can only be seen and touched when the box is opened.*

What is the system unit (system case).*This is a box like computer device that contains the internal components of a computer.* ***System case***

- *It houses the processing hardware for the computer*
- *Protects the internal parts against dust, water etc*
- *Facilitates movement of the system as a unit*

Examples of System unit Hardware

- ***Power supply Unit****.*
  → *Give power to the rest of the computer:*
  → *Regulates power to the required levels*
  The role of a power supply unit is to*:*
  - Step down the incoming power.
  -It regulate power to the required level

- Converts the alternating current (AC) from Direct current (DC)
- Distribute power to other parts of a computer. Each and every part inside the computer has to receive power e.g. memory chips, data buses.

- ***Random Access Memory)*** *it is where data goes when you are entering it in the computer.* ***(****The working/temporary storage space of a computer)*
  →It holds files and programs of a computer which are being worked upon. Provide the working space for loading programs/applications
  →Provide the read and write space for editing and formatting of files
  →Contribute to the speed at which programs are loaded
- ***Disk Units****. Without them, it would be difficult to perform the process of storing the work permanently as it would be remaining the main memory.(RAM) example of these units is the*
- ***Internal hard disk***
  →Stores computer programs and software (how?)
  →It stores user information permanently
- ***Mother board****- where all circuits are plagued*
  →It provide connection point for all computer components through slots/port
  →It supplies power to small internal components of the computer
  →It ensures coordination among internal components of a computer through circuit lines
- ***Complimentary metal-oxide semi-conductor battery (CMOS).***
  *Is memory used to store configuration information about the computer which includes amount of memory, types of drives current date, time ,passwords among other****s***
- ***Video card/VGA.****It provides an interface for a monitor to connect to the motherboard.(interface: The interaction between)*
- ***Data Buses****: These are highways on which* ***data travels/*** *moves to different parts of a computer. Using data buses, data can move from the* ***keyboard****, to the main memory.therefore, transmits data from point to point within the computer system*
  Fun:*It cools down the processor. It blows off dust from the processor*

Those that are categorized according to the functions they perform may include:-

1. *Input devices (hardware)*
2. *Output devices (hardware)*
3. *Processing hardware devices*
4. *Storage devices*

State four classifications of computer hardware *→* ***Input devices****-components that enter data*
→ ***Storage devices-****components that store information either temporary or permanently*
→ ***Processing hardware*** *–devices that convert raw facts into meaningful information*
→ ***Output devices*** *–components that displays/bring out computer held information in either hardcopy or softcopy.****Softcopy****-digital copyIs the page of work displayed on a computer screen* ***hardcopy****.A page of work printed on paper or any other printing medium [cloth]*
Give three situations where a hardcopy is preferred to a softcopy *→In a situation where stamp is required*
→In a situation where handouts are required

State two devices that can be used as both input and output.

- *Digital camera.*
- *Smart board.*

- *Touch screen.*
- *all in one printer*

List three examples of input devices (3mks)

- *Keyboard*
- *Mouse*
- *Joystick,*
- *Scanner,*
- *Digital cameras,*
- *Touch screen*

Other input devices

- ***Stylus and graphics tablet****: Pen like pointing device which uses pressure to write text and draw lines*
- ***Optical Character Recognition Reader (OCR):*** *These include a small optical scanner for reading characters and sophisticated OCR software for analyzing what is read.*
- ***Optical Mark Recognition Reader*** *(OMR) used to sense handwritten marks such as small circles or rectangles made on pre-printed forms in certain places*
- ***Bar Code Reader Magnetic Ink Character Recognition Reader*** *– Can input (read) text printed with magnetized ink.*
- ***Magnetic Strips Reader*** *– Used top input (read) information contained in the magnetic strips on cards like ATM cards, and credit cards*
- ***Microphone*** *– An input device that allows the speaker to speak to the computer to enter data and instructions into the computer.*
- ***Voice Recognition Device*** *– is the computers capability to distinguish spoken words.*
- ***Web cam*** *– A video camera whose output displays on the web page.*
- ***Sensor or remote sensor*** *– input device that can detect external changes in an environment*
- ***Biometric Devices****-Electronic devices that can understand and interpret configured biological parts/human being character.*
- ***Digital Video camera***
- ***PC Camera***
- ***Graphic Tablet****. Flat rectangular electronic plastic board on which a stylus writes or draws*
- ***Voice Recognition Device****. All types of microphones which are used to capture sound.*
  Joystick*. For playing computer games*
  Magnetic ink character recognition devices*. Can read txt printed with magnetized ink (cheques)*
  Optical character recognition devices*. Scans x-ters and read objects, picture and drawing*

A printer *is an out device that produces hardcopy (change softcopy to hardcopy).*
A scanner *is an input device that enters a softcopy (change hardcopy to softcopy)*

WHAT IS A PRINTER

A printer is an output device that brings out computer held information on paper or any physical medium.

Two categories of printer.

Impact*-make noise while printing e.g.dotmatrix, line, daisy wheel and character printers)*
Non-impact*: they don't make noise while printing e.g. lease, desk, inkjet and thermal*

Advantages of Impact Printers

1. *They are not very expensive*
2. *Some impact printers are very fast; they can print at a speed of 160cps thus increasing productivity.*
3. *They are easy to maintain, their print heads only require periodic cleaning.*
4. *They are reliable; they can print over 100 million characters in their life span.*
5. *They can print on continuous paper especially dot-matrix printers*

Disadvantages

1. *They are noisy during operation. Because of the contact between print heads and the print medium*
2. *They have a lower print resolution compared to other types of printers*
3. *The head usually overheats during long hours of printing which slows down the process of production.*
4. *They are slower in printing compared to non–impact printers*

Advantages of nonimpact printers

→ They are nearly noiseless since they do have very few moving parts to generate the noise.
→ They also consume very little power (almost a sixth) compared to other printers.
→ Their print mechanisms are reliable because they do not experience inconveniences with paper jams or blocked nozzles.
→ Thermal printers produce clear and crisp images with very high resolution

(b). Mention any two practical uses of the light emitting diode on a printer.

- ✔ *Shows whether the device is ready.*
- ✔ *Shows whether the device is idle.*
- ✔ *Shows whether the device is on.*
- ✔ *Shows whether there is a problem e.g. paper jam.*
- ✔ *Shows whether the printer tray has run out of paper.*

Advantages of using thermal printers

- *They are nearly noiseless since they do not have any moving parts to generate the noise. The paper is placed into the printer and characters are formed as they get heated.*
- *They consume very little power (almost a sixth) of other printers.*
- *They are reliable because they do not experience inconveniences with paper jams or blocked nozzles*
- *They produce clear and crisp images with very high resolution.*

Disadvantages

- *They cannot print on any paper because the heat generated will not cause any discoloration without burning the entire paper.*
- *The paper used has a limited shelf life. It can be affected by age, sunlight, humidity and other chemical vapors which may cause it to discolor completely thereby causing the wordsto disappear.*
- *The paper has to be specially prepared before they can be used in printing, which creates delays.*
- *Their print heads cannot be serviced or repaired, which makes them expensive to maintain. The whole print head must be replaced*

- *The printing speed is also so slow because the heads have to be allowed time to cool before the next printing cycle.*
- *They have a shorter life span than other printers. Their print heads are expected to print a maximum of 10 million characters accurately whereas other print heads like dot matrix printers go over 50 million characters in their life span.*

Ways you can care and maintain your printer

- *Keep your printer clean*
- *Keep it covered*
- *Turn it off when not in use*
- *Use it frequently to ensure its proper working condition*
- *Carry out maintenance every 1 or 2 months*
- *Avoid cheap/refilled ink cartridges and toners*
- *Avoid also cheap paper because can affect the print quality due to paper jam*

Factors to consider when buying A printer

- *Resolution*
- *Speed*
- *Ink cartridges and toner*
- *Cost of the printer*

Demerits of dot matrix over laser jet

- *Very slow at printing work*
- *Produce a lot of noise*
- *Produce poor quality out put*
- *Expensive to use in the long run*

Use of light emitting diodes on a printer

- *To report errors in a device e.g. paper jam*
- *Indicates activity hardware is carrying out*
- *To show whether the device is ready*
- *To show whether the device is ldle*
- *To show whether the trays of the printer are out of paper*
- *To show whether the device is working/is on*

Situation That May Let A Printer Not Working

→*Paper jam*
→*Printer may not be installed in the computer system*
→*Printer has run out of paper*
→*Printer may have mechanical faults*
→*Printer has run out of ink/cartilage*

NB.Paper per minute (PPM)

Number of pages a printer is capable of outputting in a given period of time.

The Monitor

This is an output device that displays a softcopy (Non- tangible copy) as visual information. The size of the monitor is measured in diagonally and in inches There are two main types of display devices or monitors

A video screen with a cathode ray tube (CRT) with extended hind part which is used to project a beam of electrons at a fluorescent surface that emits light and creates images.

A video screen with a Liquid Crystal Display (LCD). Which is flat and smaller screen with liquid crystal rather than a cathode ray tube to create images on the screen

Advantages of CRTs

→Can produce fast and good color output →They have a very wide viewing angle→They are cheaper than LCDs→They have a better resolution ***Disadvantages of CRTs*** *→Emit higher EMR (Electromagnetic radiation) than LCD monitors→Consume more energy than LCD Monitors→Occupy bigger space in the room→Not easily portable* ***Advantages of LCDs*** *→Requires less desk space→Are more energy saving (Use less power)→Radiation emitted by it is negligible →Have good resolution→Are more portable→Can easily be mounted/planted/pined on the wall→They are lighter and therefore easy to transport→Have little radiation and thus have less effect on the eyes* ***Disadvantages of LCDs*** *→They are more expensive than CRTs→They have a very narrow viewing angle→They have a relatively poor output compared to CRTs→Slow response at times*

Terminologies

→ ***"Dead Tree Edition"*** *The printed paper version of written work*

→The quality of a monitor depends on the ***Resolution.***

→ ***Resolution.*** *Is the sharpness and clearness of an image Measured in* ***dots per inch (dpi).*** *→* ***Dot Per Inch (DPI)-*** *Number of dots that make up a picture in a small space of an inch****.*** *It explain how clear the image printed on paper can be depending on the number of dots that make up a picture in an inch→* ***Dot Pitch.*** *The vertical distance between each pixel, which is a measure of image quality.→The smaller the distance the sharper the image*

→ ***Refresh rate.*** *The speed that the monitor redraws images on the screen. Measured in Hertz (number of times per second).*

→ ***Pixel****: stands for picture element. A single point in a graphic image.*

→And the more pixels used to represent an image, the closer the results can resemble the original.

→The distance between each pixel to the other is one we call dot per inch

→ ***Refresh rates****: The number of times in a second that a monitor draws the image or information repeatedly on a screen*

→The speed taken to complete a cycle can be referred to as frequency measured in hertz.The higher the refresh rate, the higher the clarity of the image

Devices that can act as both in/out

→Touch screen

→Fax

→Smart phone

→Digital camera

Information Is Stored/Held In The Computer in Inform Of Bits And Bytes*A bit is abbreviation for* ***B****inary* ***D****igits****A byte*** *is a standard unit for measuring data or a group of eight bits put together*

8BITS	***1byte***
1KB	***1000bytes***
1MB	***1000000bytes***
1GB	***1,000,000,000bytes***

OR equivalent to;

1KB (kilobyte) = 1024 bytes (2^{10} bytes) ----≈ 1000 bytes.
1MB (megabyte) = 1024KB (2^{20} bytes) ----≈1million bytes.
1GB (Gigabyte) = 1024MB (2^{30} bytes) ----≈1 billion bytes.
1TB (terabyte) = 1024 GB (2^{40} bytes) ----≈1 trillion bytes.

Primary Storage Vs Secondary Storage.

*Primary storage is the working space of the computer that temporarily holds all open Programs(volatile)e.g. RAM & ROM.****WHILE*** *secondary storage offers permanent storage of one's information for Future reference.(backup or non-volatile****NB.Backup****-Involves making multiple copies of a piece of data*

RAM	***ROM***
It is Volatile	*It is non-volatile*
It can be read and written to	*Its contents can only be read*
It offers temporary storage	*Offers permanent storage*
Its size can be increased	*Its size may not be increased*

Merits of RAM in relation to computer

→*Working space of the computer*
→*Holds the OS of the computer when the computer is on*
→*Holds the programs being worked upon by the CPU and releases one at a time.*
→*Determines the speed of the computer*

Give three commonly used storage devices

→*Hard disks/fixed disks*
→*Floppy disk/diskette*
→*The compact disks (CD-ROM) or CD*
→*Flash disks*
→*Tapes*
→*Zip drives*
→*Punched cards.*
→*Memory*

State any three advantages of using compact disks for data storage.

- *Relatively cheap if compared with jump/flash drives, HDDs and memory cards*
- *Relatively permanent*
- *Come in a variety of sizes – i.e. mini and full sizes*
- *They are portable*
- *Take several forms – re-writable, recordable, etc*

Classification of storage devices according to the technology used to read and record data*Magnetic-Devices that uses a magnetic head to write data to and from a magnetized medium.*

Examples Devices that use magnetic technology.

→*Magnetic tapes* →*Digital audio tapes*

→*Reel-to-reel audio tape recording* →*Floppy disk*

→*8-track cartridge*

→*Compact audio cassette*

Solid state/static:*Device that is purely electronic with no moving part*

→*They contain no mechanical parts. Allowing data transfer to and from storage media to take place at much faster speed*

→*It provides a more predictable lifespan for the storage media*

→*They also requires less power and cooling*

→*They are generally lighter*

They come as

Solid state drive*-flash memory disk* ***Solid state card-****memory card*

Solid state modules*-microfilm, microfiches****Optica****l-Devices that use laser light technology to store and read data to and from the it*

Data is written to a surface of a disc by spinning while focusing a high power laser beam .CD/DVD

The RAM size determines the speed of the computer. Give any two characteristics of RAM.

→*RAM is temporary (volatile) storage because its contents disappear when the computer is switched off.*

→*Its contents are user defined i.e. they can decide what can be contained in RAM.*

→*RAM can be changed or removed.*

→ *Occupies the major portion (70%) of the main memory*

→*RAM size can be changed or increased.*

→*The contents of RAM can be read and written to*

Explain two types of RAM in a computer. ***Static RAM (SRAM).****is very fast compared to DRAM and holds its contents as long as there is power.*

Dynamic RAM (DRAM).*however; can hold its contents for only a short period of time even when power is on. The contents of DRAM can be maintained by refreshing the memory chip several times per second*

Write short notes on the following

Microprocessor/CPU.(*Central Processing Unit)→This is an integrated circuit (chip) that does the entire full scale computing* →*A hardware component where all operations of the Computers take place.*

The CPU consists of three main parts: *The two functional units and a set of workspaces that is Control Unit, Arithmetic Logic Unit and Registers as its workspace.*

The control unit (CU)

The Arithmetic Logic Unit (ALU)

The Registers.

Control Unit
→It does the fetch, direct and forward activities within the CPU
→It controls directs and coordinates most of the activities carried within and outside the CPU during operations.
→Interprets and carries out basic instructions that operate a computer.
→It has the overall function of controlling and coordinating all the operations within the C.P.U.
In short, *it fetches instructions from memory, translates it and interprets it to computer and sends instructions to other computer hardware units to execute them. And determine the next instruction to be executed*

Arithmetic and logical unit.*This is a section where the actual execution part of the instruction cycle takes place during the processing operation.*
Function
→It performs the arithmetic
→It carries out comparison of data items
→It carries out logical operation
Arithmetic operation *includes-addition, subtraction, multiplication and division.*
Comparison*-involve comparing one data item to another by using three conditions; greater than (>), less than (<), or equal to(=)*

Registers.
Registers are high-speed temporary storage locations used to hold data and instructions.
It stores data within the CPU during, before and after processing temporary
Holds data or instructions during data processing.

Examples Of Register
*→**Accumulator**: this temporarily holds the results of the last step of ALU*
*→**Instruction register**: this temporary holds an instruction just before it is interpreted into a form that the CPU can understand*
*→**An address register**: this temporarily holds the next piece of data waiting to be processed*
*→**Storage register**: this temporary holds a piece of data that is on its way to and from the CPU and the main memory*

State Any Four Operations Of The Machines Cycle Of A Central Processing Unit*This is are series of operation needed to execute a single instruction and these are;*
*.**Fetching**: The process of obtaining data items from memory*
Decoding*: This is the process of translating the instruction into commands that the computer understand.*
Executing*: This is the process of carrying the commands.*
Storing*: This is the process of writing the results to memory. Is when the result of the instruction is written to its destination?*

NB.Storage medium*; physical material on which a computer keeps data, instruction and information for future use.*
Storage capacity*. The number of bytes (i.e. characters) a storage can hold.*
Reading: *the process of transferring data, instructions and information from a storage medium*

into memory
***Writing**: the process of transferring items from memory to storage medium*

***The processing speed:**How fast information is processed depends on the type and performance of the CPU and within the CPU there is a device called the clock that controls the reception and execution of instructions given to the CPU and the faster the clock pulses, the faster the CPU, Hence the faster the computer can process data. **System clock**-this controls the functional speed of the processor .To determine the system speed*

Ways Of Processing Data
***Parallel processing**: The use of multiple processors to execute a program at same time*
***Multiprocessing**: The execution of more than one program by the same processor*
Multiprogramming**: The processing of two or more programs by the same processor at the same time. **Batch [group] processing** -System in which data to be processed are first accumulated over a specified period of time and then processed as a group[batch]**Special Purpose Memories*Buffers**. This is a region of memory that is used to hold data temporary while it is being moved from place to place.**Virtual memory**-Type of memory that supplement on the RAM space when the space of RAM is finished and the computer still has data to process, (usually on the hard disk)*
***Cache memory**. - Faster memory which help to speed up computer processes by storing frequently used instructions and data.*
- It stores copies of data from the most frequently used main memory. -Transfers frequently used information
***Buffers-**This is a region of memory that is used to hold data temporary while it is being moved from place to place*
***CMOS** (complementary metal Oxide semiconductor)is memory used to store configuration information about the computer which includes amount of memory, types of drives current date, time*
-Store system setup

Ports And Connectors
***Port: connects** external devices to system unit.**Connector**: joins cable to peripheral**Power supply**: converts AC power into DC power. this is a path on the mother board of the CPU used to send from or to peripherals RAM and ROM*
***Bus**: channel that allows devices inside computer to communicate with each other.*
***Bus width:** determines number of bits transmitted at one time.*
***System bus**: connects processor and RAM*
***USB**: universal serial bus. Port that can connect up to 127 different peripherals together with a single connector type.**Expansion slot**: an opening, or socket, on the motherboard that can hold an adapter card. **Parallel port:** connects devices that can transfer more than one bit at a time, such as a printer **A serial port:** transmits one bit of data at a time. Connects slow-speed devices, such as mouse, keyboard, modem*

State the difference between an address bus and a data bus.
*An address bus consists of all the signals necessary to define any of the possible memory address locations within the central processing unit, **while** A Data Bus (memory bus) is used to transfer instructions from memory to the CPU for execution.*

Identify two ports used to connect peripheral devices to the computer. (any2x1mark)

- *USB port*
- *Serial pin port*
- *Audio port*
- *VGA port*
- *Parallel port*
- *Ethernet*

Plug and play -*Peripheral device interface that can allow components to be installed, configured and used immediately without rebooting the computer [USB and fire wire]*
Hot swappable -*Interface that support devices that can be plugged and removed from the computer without shutting down the computer.i.e.while the computer is still running.(USB and Fire wire)*

SOFTWARE COMPONENTS OF A COMPUTER Software *is a set of detailed step-by-step instructions, which enable the computer hardware to perform its assigned tasks* ***Computer software is sub divided into two main groups:The Systems software*** *[for the computer's self operations]. Programs that control the operation of a computer and its device*
Programmers' that start up a computer and manage the general functioning of the system devices.
*Programs that enable hardware components to function.****Applicationsoftware*** *[for the end-user to perform a specific task on the computer].Programs that perform specific end user tasks.*
Programs that enable the user accomplish his task on a computer

NB.Software suit:-*Is a collection of individual application software packages sold as a single package.e.g.ms processor*

Examples Of Application

- *All word processors: e.g. MS word etc*
- *All Spreadsheets: e.g. MS Excel etc*
- *All databases: e.g. MS Access etc*
- *Windows media player*
- *VLC*
- *All Games*

Examples Of Application

Special purpose computers
→They are designed to handle only a specific task(s)
→A program that is designed and written just to solve the particular problem

General-purpose/off-shelf
→Designed to solve a wide range of problems, they perform a variety of tasks by means of specially written programs.
→They are pre-written general purpose programs purchased from the shop by the use

Advantages of off the shelf software over custom made.

- ✔ *Relatively cheap*
- ✔ *They are easy to use.*
- ✔ *They are provided with extensive documentation to help the user.*
- ✔ *Compared to special purpose programs.*
- ✔ *They can be customized to solve other problems*
- ✔ *Have less error*

Three categories of system software (3mks)

- *The Operating system.*
- *Utility programs.*
- *Programming languages and Language processors*

Utility programs

→These are service programs that are used to enhance the performance of the computer.
→Utility software helps to analyze, configure, optimizes and maintains the computer.

Examples of utilities

*→**Sorting of files**These arrange data as specified by the user to locate them easily*
*→**Debuggers** remove errors in programs*
*→**Merging utilities** enable the user bring files together*
*→**Compressors** reduce file sizes for easy sending over a network*
*→**Defragmenters** bring file fragments together thus freeing space for the user to utilize*
*→**Back–up utilities:** Help in making duplicate copies of every file on either internal or external media as security files for reference incase the original copy is destroyed.*
*→**Data Recovery utility**: Used to "undelete" or resurrect a file or information that has been accidentally deleted.*
*→**Defragmentation utility** or "Defragger"*
Used to find all scattered portions of files on the hard disk and reorganize them as contiguous files.
*→**Disk defragmenter**: Whose contents have been stored on the hard in disjoined area and join them together to increase efficiency*
*→**Disk Repair Utility**. Checks your disk drive for defects and make repair on the spot.*
*→**Disk cleaner**.Can find files that are unnecessary to computer operation or take up considerable amount of space.*
*→**A disk checker**: can scan the contents of a hard disk to find files on areas that are corrupted in some way, or were not correctly saved and eliminate them for a more efficiently operating.*
*→**Data Processing Utilities.** Utility programs which remove redundant elements, gaps, and unnecessary data from computer storage space*
*→**Memory management utilities:** Are programs that determine how to efficiently control and allocate memory resources.*
*→**Encryption**-utility use a specific algorithm to produce an encrypted stream or encrypted files when provided with a key and plain text*
*→**Merging Utility**: - Allows data from more than one file to be combined into one.*
*→**Copying/Backup**:- This allows the creation of a duplicate copy of the original.*
*→**Merging Utility**: This allows data from many files to be combined to make one file.→**Ant viruses.** Scan the computer to ensure proper functionality. →**Anti-virus:** This detects and removes viruses from the computer.*
*→**Data compression:** Frees space on storage device (hard disk) by removing redundant data*

Programming language.→*Are the artificial languages designed to communicate instructions to machine, particularly a computer*
→The means of communicating with the processor.(Computer).
→They can be used to create programs that control the behavior of a machine.→Languages in which local instructions are written for a computer to perform different tasks.→It is the logical flow of

instructions in accordance to predetermined rule of grammar (syntax) of that specific language in order to form a program.

Four classifications of programming language

- *Machine language*
- *Assembler languages*
- *High level language*
- *Four generation language*

Categories of programming languages. *→Low Level Languages.(Machine code, assembly)→High Level Languages.(3th,4th and 5th generation)*

Low level language
*These are binary languages that are closely related to the computer processor. They are written in binary format of 0s and 1s****Examples of low level languages*** *Machine code/object code language/1st generation languagesAssembly language/2nd generation language*

Machine code: *They are written in binary format 0s and 1s*
→Very difficult to learn and very unfamiliar to humans
→Programming is likely to have errors
→It is easily understood by the processor

Assembly language. *Languages those were made/invented to simplify machine code language→It is easier to be understood and remembered by humans compared to machine language*
→It uses few English abbreviation or words.e.g. SUB for subtract FNO for first number
→It is easier to understand than the machine code.

High level languages. *Languages that use English words aimed at making programming much easier than before*

Merits *There were introduced as an improvement for assembly.They make programming much easier due to use of English wordsFewer instructions are written and others are automatically generated Less time is spent to write a lengthy program.****Demerits*** *Can be easily be understood by the computer processor*

Categories of high level languages *They are grouped into 3rd ,4th.and 5th generation languages.*

Examples third generation language *→Pascal →COBOL-common business oriented languages→BASIC-beginners all purpose symbolic instruction code→FORTRAN-formula translation→Java→Visual basic →C.C+,C++*

Fourth generation language *→TheseHHL designed to make programming even easier.→They consist of mainly predefined functions and procedures which need little customization→One doesn't need to know the details of the actual program codes→The code are generated automatically→The programmer only changes a few codes in order to come up with the program he wants*

An example of 4GL is my structured query language (SQL) *→Fifth generation languages →These are normally used in intelligence based systems such as robots→These languages manipulate facts*

and rules to reach a conclusion →They mimic human action →They are extensively used in artificial intelligence projects like in mars exploration.

***Syntax** refers to the spelling and grammar of a programming language.*

LANGUAGE PROCESSOR

Programs used to translate HHL into LLL and back into HHL

Examples Of Language Processor

*→**Compilers** it translate the entire high level codes to low level codes at once/at the time of compiling*

*→**Interpreter** translate a source program line by line while the program is running.*

*→**assembler:** these translate assembly instructions into binary code or machine code*

*→**Linkers**: these combine compiled programs and determine where the program will be located in memory*

Use Of Computer Programming Language

***Compiler-help** to translate HHL code to LLL codes at once*

***Interpreter-helps** to translate HHL to LLL in smaller bits*

***Debugger-helps** to remove error in programming codes*

OPERATING SYSTEM

A group of programs that manage all the activities on the computer .Be OS, Linux, Windows operating system etc.

*The **operating system** communicates faults and detection of new devices.*

*The **O.S** is the coordinator of all system devices/resources.*

Functions of the operating system

→Memory management
→Booting the computer
→Providing the user interface
→Processor management
→File management
→Managing the storage
→Administering security
→Monitoring system performance
→Helps in configuring devices
→Scheduling computer
→Error handling

Give two considerations for one to choose an operating system.

→Computers specification e.g. memory capacity, processor speed, hard disk capacity etc.
→The type of computer in terms of size and make.
→The application software intended for the computer.
→User friendliness of the operating system
→The cost of the operating system
→Reliability and security provided by the operating system
→The number of users it can support

THE MAIN CATEGORIES OF OPERATIN SYSTEM**Desktop Operating System -***These run on desktop computers.eg.*

→DOS→Windows 3x→Ms-Windows 95→Ms-Windows 98

***Networking operating systems**:-These are designed to be used on several computer that exist on a network*

→Novell NetWare
→Windows 3.11 (windows for workgroup)
→UNIX
→LINUX

***PDA operating systems-**These are designed for small devices and examples are →Windows CE (windows compact edition)→Palm operating system→Pocket pc 2002*

***Other operating systems.**Are **t**hose designed for specific computers?→Mac operating systems (Macintosh computers)→ARCONRISCOS (machines that use Arcon processors)→VMS for DECs mini computers→System-7 for apple Macintosh computer*

We can also Categorize Operating Systems as follows :

i. *According to the number of users it can support simultaneously.*
ii. *According to the number of tasks it can perform simultaneously.*
iii. *According the user interface it provides*
iv. *According to the way or where they are used.*

According To The Number Of Users
*Single-User Operating SystemsMulti-User Operating System**According To The Number Of Tasks** Single Tasking Operating System Or Single Program Operating SystemMulti- Tasking Operating Systems **According To The User Interface** **Interface** means the interaction between the user and a computer **Or**the way how a computer present it's self to a user, and the way how a user responds to it. **The user interfaces include the following:**Command line interface (CLI)Graphical user interface (GUI)Menu driven interface*

*d).**Graphical user interface (GUI) operating systems***
A type of user interface that allows users to interact with programs by manipulating graphics, along with a keyboard and pointing devices such as a mouse, to provide an easy-to-use interface to a program. GUI allows one to enter commands by pointing and clicking at pictures (icons) that appear on the screen. It allows the use of a mouse to click at icons or graphics on the screen.
***Command-driven** Operating Systems lets the user type a command at a command prompt. The commands are executed after pressing the Enter key or the Return carriage.*

***Mouse-**This is a hand held device that basically moves the pointer on the screen.*

- *Selecting text*
- *Drugging and dropping*
- *Navigating text by scrolling*
- *Confirming operations*
- *Used for drawing*
- *Used for sizing objects*

Examples of Operating systems which provide GUI include:-

- *Windows 3.x*
- *Windows 95*
- *Windows 98*
- *Windows NT*
- *Windows 2000*
- *Windows ME*
- *Windows XP*
- *Windows Vista*
- *Windows me*
- *Susie Linux*
- *Novell Netware*
- *Apple Mac OS*
- *Linux*

DOS (CLI) ***WINDOWS (GUI)***

Requires little memory →More memory

Requires less disk space →More disk space

Not user friendly →User friendly

The user has to know the commands or Look them up → The commands are much more intuitiveThe commands usually have to be entered in ful →Command shortcuts are possible such as <Ctrl> C to copy

There are no graphics → Graphics are used to represent tasks, files etc.

There are no menus → Menus are used for making choices and selections

The user has complete control →The user choices are restricted to those on the menus

Commands have to be entered accurately with the correct spellings and syntax (rules) → Spelling and typing errors are avoided

No pointing device is used → A pointing device is used to select items and make choices

The interface is more difficult to use and the user is more likely to make mistakes →The GUI is more user-friendly

More learning and training is required→ less learning and training by the user is required

State the difference between software upgrade and software update.

→Software update provides bug fixes and minor software improvements while;

→software upgrade is a purchase of a newer version of software with new features to your current software.

Interface *means the interaction between the user and a computer* ***Or****The way how a computer present it's self to a user, and the way how a user responds to it.Give four different types of devices that allow human being to interface with computer system identifying how?*

Key board *Projector*

Mouse

Monitor

Shareware software:

→Application software that is given out to people to try it for a given time and pay for some after

→Copyrighted software that is distributed free for a trial period and payment required for using the software beyond that trial period

Firmware *Also as stored logic is a combination of both the software and hardware recorded permanently on electronic chips.{usually Read- Only-Memory chip that is planted into the motherboard}****Open source:*** *Type of application where users can be able to view the code source and make some modifications****System update.*** *Provides bug fixes and minor software improvement*

Software update *Is a purchase of a newer version of software you currently use of a more fully-featured version of your current software.*

Factors to consider when choosing a package

User requirements
Documentation
User-friendliness
Market confidence/performance of the package:
Technical requirement:
After purchase service\support:
Up-to-date
Modification
The cost of the package vs benefits

Freeware*. Is software provided at no cost to users?****Interpreter****. Is software that translates the source program line by line while the program is running?*
Basic*. Is software that is used to teach junior programmers?****Single user license.*** *A license agreement that gives a software buyer the right to use [install] software on a single computer at a time*
Site license.*-Gives a software buyer the right use/install the software on multiple computers at a single site*

Features that make GUI based OS user friendly

Windows
Icon
Menus
Pointer

MICROSOFT WINDOWS.

Microsoft windows had been described as a GUI. This is an interface in which almost everything is represented graphically.
It's an environment that enables one to:-

- *Easily start up and work with applications.*
- *Run more than one application at a time.*
- *Transfer information between applications.*
- *Organize and manage files created in these applications easily.*

PARTS OF A WINDOW.*Most windows have all or some of these features.*

1. ***Control Menu Box.*** *Located in the top right corner of a window. It consists of the control menu which is activated by clicking on this box.*
2. ***Title Bar****. This stretches across the top of the window and contains the name of the application, document. On the right of the title bar, there are three tiny buttons namely:-*
3. ***Minimize and Maximize Buttons and Close.*** *Located top right corner of a window.*
   - ***Minimize:-*** *reduces the window to the bar.*
   - ***Maximize:-*** *increases the window to fill the entire desktop.*
   - *When the window is maximized, the restore button replaces maximize button.*
4. ***Scroll Bars.***

These appear on the right and bottom of windows. These help to move the work area up and down if it contains more items. It cannot fit in the visible work area. Scrolling brings hidden items into view.

5. ***Windows Borders.***

These are the perimeters which define the wonders work area.

The Tool Bars *(Buttons arranged in a row).*
Menu bar- provides a list of commands to manipulate a task.
Standard tool bar.Formatting tool bar.Status bar.
Work area- where a document is created.

WHAT ARE WORD PROCESSORS?

A word processor is application software that is used to create, save, edit, format and print documents that contain text and graphics.

Examples of word processors include:

- *Microsoft Word*
- *Word Perfect**
- *Lotus Notes*
- *WordPro*
- *WordStar*
- *Lotus WordPro*
- *Corel WordPerfect*
- *Perfect Writer*
- *Text Editor*
- *Professional Writer*
- *Notepad*
- *Word pad*
- *Dos Editor*

Word processors are mostly used for the following purposes or functions

- *Writing/ typing letters*
- *writing reports*
- *Writing books*
- *Writing essays*
- *Making memos*
- *Designing Curriculum vitae*
- *Writing articles for books, magazines or newspapers etc*

Features of the program used to create this work.

↔***Thesaurus-****A feature that helps you find the meaning and other words that can be used instead of the one you want to use*
↔***Drop cap-****A feature in MS that lets a letter to begin more than one line*
↔***Foot notes -****A feature that helps you adds extra information on what you have written in your document it is put at the end of page.*
→***Endnotes*** *are placed at the end of a text.*
↔***Mail merge-****A feature that makes similar letters have to be sent to several people.*
↔***Save as -****Is a situation when you're keeping/storing (saving) a document for the first time.*→***Saving****.The act of transforming data/information from memory (rom) to the storage medium*
→ →***Footer.****Text that appears in the bottom margin of the page repeatedly*
→*Is text that is separated from the main body of text and appears at the bottom of a printed page margin?*
→***Word wrap****- Word automatically starts anew line when you reach the end of the current line*
→*Allow a user to type continually without pressing the enter key at the end of each line*
→***Formatting a text.****Changing the text appearance*
→***Clip art****.inbult images in word processor library*
→***Clipboard.*** *Temporary files used to store information.*→***A drop cap****: is a letter that begin more than one line*
→***Water mark****: a text or picture in the background of a document* →***Indent****: the space between a page's margin and where the text begins .Generally the first line of a paragraph is an indent*
→***Mail merging****- Enables similar letters to be sent to several people. The names and addresses of each person can be merged with one single standard document printed out.*

→***Headers:*** *are words that are inserted at the top and will appear on every page*
→***Character map:*** *Is used to enter special characters that do not appear on a keyboard*→***Indenting****: refers to the increase or decrease in the amount of space between the text and margin* →***Hyperlink.*** *Is a reference to data that the reader can directly follow, or that is followed automatically to a section within a page or entirely a new document or file..*→***Find and search.*** *Allow user to locate all occurrences of a particular character word or phrase*→***Replace :****Allow a user to substitute existing characters, word or phrase* →***Spelling checker*** *Allow a user to check and correct the spelling of a whole document at one line.*→***Grammar checker:*** *Reports grammatical errors and suggests ways to correct them*→***Automatic page numbering:*** *Numbers the pages automatically in a document* →***Tables: Allows*** *a user to organize information into rows and column.* →***Thesaurus:*** *Suggest alternative words with same meaning*

<u>Advantages Of Word Processor Over Type Writer</u>

→*A document can be stored on the computer for future reference.*
→*They reduce on storage costs because the files on the computer do not occupy space like the paper files.*
→*Word processors are easier and more efficient to use because some actions are automated. For example the word wrap feature which takes the cursor to the beginning of the line once the current line has been used up*
→*They have special editing tools such as spelling and grammar checker and thesaurus that help the user to easily correct grammar and spelling errors. Thesaurus helps the user to find words with similar meaning.*
→*Word processors have superior document formatting features. For example, underlining, boldfacing, italicization, applying different colors etc. Formatting refers to the art of making the document more attractive and appealing to the eye. Thus word processors can print work of better quality.*
→*It automatically corrects errors by the use of the spellchecker feature while typing*

State two ways on how data can be emphasized?.

→*By Boiling*
→*By Underlining*
→*By Changing Font Size*
→*By Changing Font Colour*
→*By Changing Text Direction*
→*By Changing Text Alignment*

State one function of the each of the following in relation to data processing.Space bar*.Provides a gap between words while typesetting.Used to align pictures.****Enter key****.* →*Used to create a new line or paragraph.*→*Used to force a page break.*
→*Used to confirm a command e.g. do you want to save this file?****Backspace -****Deletes a character to the left of the cursor* ***Delete-****It erases a character to the right of the cursor****Scroll bar.****Used to move a page left, right, top and bottom.****Num Lock****-Activates or deactivates numeric key pad*
Esc key
→*Used to cancel an activity or operation*
→*To stop or pause a presentation*
→*Used to go back to the menu platform in games*

→Used to go the start menu in a windows computer (Ctrl+Esc)
→Erase and get out of the spotlight menu
→Hide your browser cursor
*→Reverse your "make this tab a window" drag**Save**. Used to keep or store a document in a computer for future use. . **Drag.** A pointing device gesture in which the user selects a virtual object by "grabbing" it and moving it to a different or onto another virtual object*
*→Involves in moving an item (file)by scrolling or click hold & move it to different direction →Is a pointing device gesture in which the user selects a virtual object by "grabbing" it and moving it to a different location or onto another virtual object.**Copy.** Involves in duplicating an item (file*

Teachers of the other school use typewriters for all letters and forms. The school has decided to introduce word processors to make office work more efficient in term one of next year. State five reasons as to why this change may worry some office staff.

- *Technophobia/techno stress*
- *Loss of jobs say for messengers in cases of networking*
- *Health issues for eye defects, back pains, etc*
- *Fear of Cost of retraining or learning new skills*
- *Fear of increased electricity and subscriptions costs*
- *Fear of computer related crimes like forging of documents*
- *Fear of loss of man-hours through computer games and playing games and videos during working hours*
- *Data loss by viruses and systems crashing*
- *Computer related errors and accidents.*

State two advantages of mail-merge as used in a word processor.
→Saves one of typesetting the same documents for deferent recipients.
→Guarantees accuracy since names of recipients are picked from the database.
→Uniformity of the wordings is assured since it is the same letter one sends to different recipients
→It can be harnessed for other purposes e.g. report generation and billing.

***The mouse:** This is a hand held device that basically moves the pointer on the screen.*
***Types of mice**Mechanical -This has a track ball on its underside to detect movement of the mouse**Optical-**This uses devices that emit and sense light to detect movement of the mouse**Cordless (either mechanical or optical)-**This transmits data using wireless technology such as radio waves or infrared light waves*

Mention two functions of a mouse.

- *Move the cursor on the GUI.*
- *Manipulate a computer game.*
- *Draw objects like a rectangle.*
- *Used to control music players by clicking.*
- *Used to scroll the page.*

Distinguish between clicking and dragging as used in relation to mouse operation.
Clicking refers to the pressing the primary key to issue a command to a computer, ***while,*** *dragging is any operation in which the mouse button is held down while the mouse is moved.*

Give two advantages of using a mouse over keyboard
-Easy selecting of items or move to a particular position-A trackball mouse is good for limited desk space .user does not need to move the entire device -Better for diagram drawing

Name any two standard keyboard layouts
- *QWERTY*
- *GKOS*
- *CHORDED with very few and integrated keys*
- *American standard layout*
- *British standards layout*

Mention any three parts that make up the keyboard.
→ ***The Typewriter Area (Main Typing Area):*** *This is used for text data entry*
→ ***The Numeric Keypad****: This is made of numbers to simplifies numeric data entry*
→ ***Cursor control key****. This is made-up of arrows to moves the cursor in all directions*
→ ***The Function Keys area****: This is made up of specialized keys each performing a specialized function according to the operating system used*

State one use of a computer keyboard in data processing
→ *Used to enter text into a computer*
→ *Used select data*
→ *Used to enter an instruction during data processing*
→ *Used to align objects during data processing*

Okello deleted his file accidentally. In which two ways can he recover his file?
By pressing ***ctrl+z****pressing on* ***undo***
Opening the recycle bin and ***click on restore***

What is the difference between word processing and spreadsheet application?
Word processor involves editing text based documents like letters ***while*** *spreadsheet involves calculation*

Features of Spreadsheet***Worksheet****: A component where data is entered. In Excel.*
Row*: is the horizontal arrangement labeled 1, 2, 3…*
A column*: is a vertical arrangement of cells labeled A, B, C…*
A cell*: an intersection between row and a column* ***Formulae*** *Is a mathematical expression used to solve mathematical problem .must begin with equal sign (=)****Functions.*** *These are inbuilt predefined formulae that the user can quickly use instead of having to create a new one each time calculations are to be carried out.*

Worksheet: *- Is a grid of columns and rows. It is a component in which data values are entered. OR A single work space in a spreadsheet*
Workbook: *This is a collection of worksheets grouped together. OR Collection of work sheet****Relative referencing:*** *A cell address that changes as the formula gets pasted to other cells****Absolute referencing:*** *A cell address that does not change as the formula gets pasted to other cells. A formula where a cell reference remains fixed when copied.****Labels.*** *Any text or alphanumeric character entered in a cell****Values.*** *Numbers which can be calculated mathematically*

Types of data stored in a spreadsheet
→*Labels/Text.*
→*Numbers.*
→*Formulae*

Apart from calculations, give other two functions of excel →*It carries out a variety of tasks like*
→*Financial planning, budget,*
→*Cost projections,*
→*Cost planning,*
-budgeting, producing invoices etc
→*It can present numerical data on charts*
→*They have the aspects of speed, accuracy and efficiency which enable the user to accomplish tasks quickly*
→*They enable the user to produce neat work because there is neither pencil, rubber, nor whitewash which always made the work dirty.*
→*They have better document formatting capabilities like colors, charts, and illustrations which can make the work beautiful*

List any one unique feature of a word processor and spreadsheet
→*Watermarked, mail mergeVs formulae, and functions*

Explain The Meaning Of The Following Spreadsheets Cells Error Messages
#NAME*? This will appear when you have entered a wrong formula or some text in the formula is not recognized*
###*this will appear when the data entered in the cell is wider than the size of the cell.*
#NUM! *This appears when a formula or function has a number that has problem in it*
#REF! *This appears when a there is poor cell referencing*
#N/A! *This will appear when the value for the formula or function is not available.*
#NULL! *Error value occurs when you specify an intersection of two areas that do not intersect.*
#DIV/0!*Error value occurs when a formula divides by 0 (zero).*
#VALUE! *Error value occurs when the wrong type of argument or operand is used*

PRESENTATION SOFTWARE*Applications' software thatis used to enhance the communication process with the use of visual aids like presentation slides.*

Examples

- *Microsoft PowerPoint.*
- *Harvard Graphics*
- *Lotus Freelance.*
- *Micrographics Presenter*
- *Corel Draw*
- *OpenOffice Impress*
- *Adobe Persuasions*

Uses of Presentation Software

- *Reduces boredom- interesting graphics.*
- *Help to present and illustrate an idea in quality and different way- photos, videos, animations and diagrams e.g graphs.*
- *It can be linked to www and distributed.*
- *Teachers can use it to supplement on the teaching aid.{can present pictures of the hard to get machines or animals}*
- *Learners can use it to present their research work to their trainers*
- *Can be used for advertisement e.g. in business show rooms, into box in super markets*

Disadvantages of presentation software

- *Light control might not be possible in some rooms. Sometimes its too dark and at times too much light.*
- *Technology may break down in the middle of the presentation.*
- *The teaching does not become adaptive and reactive.*
- *It depends on the skills and creativity of the presenter.*

Microsoft PowerPoint

→this is a collection of electronic slides that can have text, pictures, graphic, table, sound and video. This collection can run automatically or can be controlled by a presenter

Examples of power point software

- *Open office impress*
- *Corel draw*
- *Word perfect*

Features of power point

- *Designs*
- *Animations*
- *Transitions*
- *Hyperlinks*
- *Sounds*
- *Videos*
- *Slides*
- *Charts*

Slides*:*
single page in power point which is part of the visual presentation file. . It's the working area equivalent to a page in word document. Slides are put together to form a file or presentation.

Presentation*:*
the entire work done referring to a particular topic or it is a single saved file made up of a series of slides and objects such as audience handouts

Template
Predefined inbuilt format and color scheme to be applied to a presentation/ it is file already created and stored in the computer for reference purpose.

Animation *Visual effects applied to individual items in a slide (images, titles or bulleted points)**.***
[*Putting monitor and or sound to various objects in your slides]*
Transition*: this is the visual movement in a given slide show. It is a method of moving one slide off the screen and bringing on another onto the screen during a slide show. Move/switch from one slide to another.*
Master slide
→Apparent slide that contains text and objects that will appear on all other slides (such as headers &footers, slide numbers, date & time)
→Is a special slide that once designed acts as a template for the rest of the slides in the show? Its features can be applied or used in all other slides

Terminologies ***Sizing handles****: - Six boxes that enclose a selected object; these may be six or four depending on the size of the object.**Presenter:** - A person who delivers a presentation XYZ Speaker.**Audience**: - Individuals who have an interest in the presentation.**Normal View.**Used to work on all slides detail in a presentationHas 3 major sections i.e.*

- *The outlines pane*
- *The slides pane*
- *The notes pane*

Guidelines forA Good Presentation

- ***Simple and readable****: Make sure you prepare a readable presentation and avoid putting many words on the slide*
- ***Avoid reading the information****: let the slides just supplement on your presentation. Make preparation early. You should not prepare your presentation in front of your audience.*
- ***Follow the speech rules****: make your communication loud, face the audience and other*
- ***Make your presentation entertaining****: use good animation, clip arts that can entertain the viewers*
- ***Use diagrams where appropriate****.*
- ***A good title slides attracts an a audience's attention*** *and tells them about & how the speaker is going to approach it*
- ***Avoid excessive use of slide transition and animation***
- ***Include only one the main points***
- ***Establish a uniform single look for the presentation***
- ***Identify the goal of the presentation***

Advantages of power point

- *Less expensive in terms of printing medium (paper)*
- *Easy to prepare*
- *Easy to edit*
- *Interactive during presentation*
- *Interesting due to its animations and transition design*

WHAT IS A DESKTOP PUBLISHING
Is used to design and produce artistic/complicated documents that contain text, graphics, and brilliant colors.

State two features of desktop publishing application programs.

Page layout, *this enables arranging text and graphics on a page-by-page basis.*
Color libraries *to ensure that colors will print exactly as specified.*
Master copies *used duplicate design features to all pages in a document.*
Frame*: areas within a publication which may include text areas and picture area*
Handles*: small circle which appear round the edge of a frame when you click on the frame*
Template: *tools having pre-chosen design styles that can be used in publisher to help you easily create basic publication*
Master page*: is a publication page with the design and layout elements that are repeated on multiple pages*
Ruler guide*: is used to mark precise positioning of objects*
Margin guides*: are found on the sides, right, left, top, and bottom of the page and used to define margins.*
Base line guides*: are used to align text to provide a uniform appearance between columns of text.*
A paste board*: is a large black region outside the printable area where objects are stored before being arranged in the printable area.*

Give two examples of desktop publishing application programs.

- *Microsoft Publisher.*
- *Adobe PageMaker.*
- *Adobe InDesign.*
- *QuarkXpress.*
- *iStudio publisher*
- *Corel draw*
- *Frame maker*
- *Broderbund Print Shop Pro*

MICROSOFT ACCESS
Is a program to create and manage databases?

Starting DBMS (MS-Access 2007)

i. *Click start button*
ii. *Point to programs*
iii. *Click the Microsoft Office Folder*
iv. *Click MS-Access 2007 (MS-Access screen appears)*

The Data Base
→Is a collection of logically related data or records?→It's a collection of interrelated data about a particular subject or for a specific purpose which allows a user to retrieve, updates and manipulated data anything

Data base management system/software (DBMS)
→Is a collection of programs that enables users to create and maintains the database
→This is software which allows a user to create, access, and manage a database.
→A program which lets a user manage information in a database

Examples of Database Management System

Microsoft Access
Oracle
My SQL
Visual basic
Dbase V
ForPro

Function of DBMS

It provides an interface for a user to enter data
Enable the creation of summary report
It enables users to create forms for input and display of data in a graphical user interface
It helps organize data in a way that allows fast and easy access to the data

Components of data base management system environment

Hardware: *They can range from PC to a network of computers*
Software: *DBMS (such as oracles, MS Access, Visual basic), operating system, network software and application programs*
Data: *Raw facts used by an organization and description of this data called schema*
Procedures: *Instructions and rules that should be applied to the design and user of the database of DBMS*
Users: *The people who use the DBMS such as a database administrator's programmers and users.*

There are mainly two types of databases;
→Manual databases →Electronic databases.However, Electronic databases are today commonly used.

Manual databases
These are non-computerized. These are traditional ways of recording and keeping data using simple devices e.g. a book with a list of items in stock, a diary e.t.c.

However, these methods/databases (manual) had /have problems/weaknesses.

- *Poor update of records*
- *Time wasting (when searching for particular item).*
- *Unnecessary duplication of data*
- *Misleading reports due to poor entry and organization.*

It's these weaknesses that led to the use of DBMS

Electronic databases
These are computer based databases. They are further categorized into Distributed database, which sit on individual stand-alone computers and centralized databases, which sit on a database server.

Advantages of electronic databases over manual

- *Enhancement of data integrity because it is centralized, fewer updating errors occur and greater accuracy can be maintained.*
- *It is easy to enter and retrieve data in a short period of time*
- *Database stores data that is consistent and reliable since at each stage ,it is checked*
- *Can store data for a very long period of time say 20years and so.*

- *Flexible since it can be redesigned, to hold thousands of data*
- *A database can be used by many people at the same time*
- *Data is frequently updated after each single entry*
- *Data is automatically saved as soon as data is entered into a database*
- *Data can be retrieved in different formats e.g.query,forms,reportetc*
- *Reduction of data redundancy – storing data in one place means less duplication and less space is required for storage*
- *Centralization of security – it is easier to limit access to information it it is grouped together instead of being kept in several scattered files. Most databases must be protected and kept private.*
- *Reduction of costs – data entry, data storage, and the development of new application programs are all made more economical by eliminating the duplication of data, organizations can realize substantial savings.*

- *Convenience*
- *Efficiency*
- *Accuracy*
- *Data security*
-

- *Data backup*
- *Confidentiality*
- *Data consistence*
- *Easy administration*

Disadvantages of Electronic Databases

- *Difficult to develop*
- *Expensive to manage.*
- *Require highly-trained expertise for maximum management.*
- *Data security may not be ensured in case of data sharing.*
- *Data can be pirated or corrupted by unscrupulous data managers.*

Functions of Electronic Databases

- *Allow the user to add and delete records*
- *Update or modify the existing records.*
- *Organize data for easy access, retrieval and manipulation of records.*
- *Act as an interface between a database and other application programs.*
- *Ensure security for the data in the database by safeguarding at against unauthorized access and corruption (damage)*
- *Keep statistics of data items in a database.*
- *Data storage; it keeps the statistics of data items in a database*
- *Enables easy data sorting*
- *Eases data update and modification of existing records*
- *Enables easy making data summary*

Characteristics of a good database.

- *It should make efficient use of computer resources*
- *Be updateable*
- *Provide easy access to authorized users*
- *Preserve data integrity.*
- *Ensure the privacy of data*

Advantages of using DBMS

- *Reduction of data redundancy. Less duplication of data and less space required.*
- *Data sharing and integration: the ability to combine data in many different ways.*
- *Improved access to data: It allows to query the database directly.*
- *Reduction of costs: many organizations can realize substantial savings.*
- *Data integrity: fewer updating errors occur and greater accuracy can be maintained.*

Disadvantages of DBMS

- *They are difficult and time consuming to develop*
- *They are expensive to setup*
- *Data can be destroyed easily*
- *It requires trained personnel to use it.*

Examples of typical data bases

School register
National voters register
National passport register
National population and housing database
Mobile phone subscribes data base
Address books

Data bases can be categorized into two:

i) *Flat File database*
ii) *Relational Database.*

i) *A Flat file database is made up of one table.*
ii) *A Relational database can take information from two or more database tables and combine them into a new table or report.*

Relationship: *This determines the way the detail in a table is related to the details in another table.*
Data Validation: *This is the checking of input data for errors before processing.*
Data Normalization: *This means minimizing any data duplication as far as possible.*
Data Redundancy: *Data is often repeated in more than one file. When dealing with monetary value such as fees balance, amount sold.* ***Validation rule****.→Gives an expression that must be true whenever you add or change a value in a field.e.g. "F" or "M"→Is a method used to check that data falls within the appropriate range or parameter defined by the database user→Logical expression that restricts the values to be entered in a field.e.g.,if you want to restrict marks entered in a field to values between zero and a hundred, type >=0 And<=100.****Caption:*** *a more descriptive name for a field to be used in a table or a form display.eg.the caption for* ***StuName*** *could be Student Name*
Input mask: *input mark automatically formats the field entry into a specified format.(mostly used to format phone and address entries*
Validation text *is a text that appears when a value violates the validation rule.e.g. Required to enter F or M for this field*

Description of data types (the top pane properties)

Data type: *Is the type of value that will be entered into the fields. These include*

> ***Text:*** *e.g. alphabetic letters, numbers, spaces and punctuations. Any combination of letters and numbers*
> ***Number****: numeric numbers 0 – 9.*
> ***Memo****.Theseare whole sentences of up to 32,000 characters in length, including spaces. It used instead of text if one wants to enter many paragraphs of text in the field*
> ***Data/Time****: used to identify a field as date or time. or both*
> ***Currency****: used to identify numeric values that have decimals or fractions.*
> ***AutoNumber****: a value used to automatically increment the values in a field.*
> ***Yes/No****:a logical field where an entry is True/False, Yes/No, etc*
> ***OLE Object****. **(Object Linking and Embedding)** Used to insert objects or graphical objects. AnyObject is a sound, picture or other object such as a word document or excels spreadsheet that is created in another program. Use this data type to embed an OLE Object or link to the object in the database.*
> ***Hyperlink:*** *A hyperlink will link to an internet or intranet site or another location in the databse.The data consist of up four parts each separated by the hash key.*

Common words used in MS-Access

Keys in database.

i. ***Primary key:*** *A field or combination of fields that uniquely identifies each record in the table.*
ii. *Used to uniquely identify a record in a table*

Note that: *the primary key cannot be the same for two records. This field can never be blank.*

Qualities of a primary key field:

- ✔ *It does not accept null (zero) value*
- ✔ *It cannot allow duplication of data in this field.*

Mention three characteristic of a good primary key

- ✔ *It uniquely identifies each row*
- ✔ *It is never empty or null –there is always a value*
- ✔ *It does not allow duplication values.*

iii. ***Foreign Key:*** *A copy of the primary key in another table. Field that related to the primary key of another table*
iv. *Used in one table to represent the value of a primary key in a related table.*
v. ***Composite key:*** *This is a primary key that is comprised of two or more fields. It can also be called a compound.*

Table*: Sometimes called database entity.. It's made up of rows and columns used for storing data.*
So a group of related data organized in fields (columns) and records (rows) on a datasheet. Or

Collection of related records
Collection of data about a specific topic ***Creating a table Design***

1. *Activate the create tab*
2. *Click* ***table design*** *in the tables group .access changes to design view and the table tools become available*

Table design allows you to define the fields in the table before adding any data to the data sheet
The window is divided into two parts. A top pane for entering the field name type and an optical for description of the field and a bottom pane for specifying field properties.

Forms*: These are screens for data entry.*
Report*: These are requests for summarizing data in tables for easy reading*
A record: *is a row on a data sheet and has a set of values defined by the field. Each record contains the data for one person as specified by the intersecting fields.*
A field: *this is a column on a data sheet and defines a data type for a set of values in a table.*
Boolean: *This is a logical field where an entry is* ***yes*** *or* ***no, true*** *or* ***false.****(E.g. if a field require you to answer whether you are a male or female.****Query****: Is a question or a request to the database****Field Name:*** *These are different categories within a table and should represent the contents of the fields such as First name, Last name, Sex; Age etc*

State two advantages of using an electronic database over a manual database.
→*It is faster than traditional means of sending messages.*
→*It guarantees message delivery and gives feedback when the message arrives.*
→*It is cost effective since most of data communication tools like E-mails are free.*
→*It is secure since it is protected by passwords and does not pass through people's hands.*
→*It is convenient since messages can be sent at any time of the day.*

Forms of normalization rules
First normal form: *it states that at every row and column intersection in the table there exists a single value, and never a list of valves.*
Second normal form: *it requires that each non-key column be fully dependent on the entire primary key. Not on just part of the key. This rule applies when you have a primary key that consists of more than one column.*
Third normal form: *it requires that not only every non-key column be dependent on the entire primary key. But that non-key column be independent of each other.*

Precautions For Designing A Good Database Table
→*It should have a primary key*
→*Should have formats and required data types*
→*Should have the required number of records and fields*
→*Each field name should be adequately described to enable future updates to the database*
→*The database should at all times avoid data redundancy I the table*
→*All large tables should be separated into small tables that can be related to enable the database to update and run very fast*

→Should have required validation rules and texts for the table for proper interaction
→Should be designed in order to allow future expansion of the database
→Should satisfy the form normalization rules

Take an example of this field name and data type

Field Name	*Data Type*		
ID Number	*Text*		
Last Name	*Text*	*Married*	*Yes/No*
First Name	*Text*	*Student Number*	*Text*
Address	*Text*	*Maths*	*Number*
Town	*Text*	*Physics*	*Number*
Company	*Text*	*Total*	*Number*
Date	*Date/Time*	*Position*	*Number*
Salary	*Currency*	*Reporting Date*	*Date/Time*
Field Name	*Data Type*		

Car makers and model	*Number of cars sold*	*Air conditioning*
BMW series x	*20*	*Y*
Opel Corsa	*11*	*N*
Nissan Micra	*54*	*N*
Ford mondeo	*09*	*Y*

i).Which field stores Boolean Data?
→Air conditition
ii).Give reason why Boolean data type is used
→It is used to answer questions where there are exactly two alternative/options
→Because it holds data that is either true or false
v). which field stores numeric data?
→Numbers of cars sold.
iii).Give one reason why numeric data type is used
→This allows a whole number or a decimal number
→Only numbers can be entered, no letters or symbols
→Calculation can be done.
iv).Identify one other data type used in database above.
→Text data type (number of cars sold)
→Forms in database. These are used as alternative way to enter data into a data base table

Creating a form using the wizard

Create
More form
Click on >> symbol
Click next (up to modify form's design)
Click modify form's design
Then click on finish

A report in database.*Report will organize and group the information in a table or query and provide a way to print in a database.*

*A **detailed report** displays all of the selected records. You can include summary data such as totals, counts and percentages in a detailed report.A summary report does not list the selected records but summaries the data and presents totals, counts, percentages or other summary data. Access has several reports generation*

tools that you can use to create both detailed and summary reports quickly.Reports can be created using wizard or design view.

Creating a report in design view

1. *Create*
2. *Report wizard*
3. *Click on >>symbol*
4. *Next (up to **what title do u what for your report)***
5. *Then click on modify reports design*
6. *Finally click on **finish***

OR

Creating a Query in Query Design

i. *Create*
ii. *Query wizard*
iii. *Ok*
iv. *Click on >>symbol*
v. *Click next*
vi. *Click on details (showing every field they record)*
vii. *Click Next*
viii. *Modify the query design*
ix. *Then finally click on **finish***

The tables below provide examples for some arithmetic operators and wild card symbols used

EXAMPLE	***EXPLATION***
>20,000	*Values over 20,000*
>=1	*Values greater than or equal to 1*
<100	*Values less than 100*
<=3000	*Values less than or equal to 3000*
<>"FL"	*Not equal to (all states beside floride)*
Between 1 and 10	*Numbers between 1 and 10*
Is null is not null	*Finds records with no value or all records that have a value*
>0 And <=10	*All numbers greater than 0 and less than 100*
"Bob" or "Jane"	*Values are Bob or Jane*
"a"*	*All words beginning with A*
**th*	*Asterisk represents the wild card that end in th e.g.25th*
**z*	*All words ending with letter Z*
*K*H*	*Find any record that starts with letter K nand end with H*
MP	*Any record that has "mp" anywhere in the field.*
**/2016*	*Find all dates in 2016*
3//2016*	*Find all dates in march 2016*

Agg: datedeff ("yyyy", [DOB], now (),)Between #2/5/1979 and #3/4/2000#Under age; year (now ())-year ([DOB])

THE INTERNET

→Is a worldwide collection of networks linked together →A collection of local area networks joined together to form a single global networkIt is a worldwide system of inter-connected computers. The internet is not a physical thing. It is just a technology for getting all kinds of computers to communicate

with one another and exchange data. These standards or rules which control the transfer of data and communication between computers are called ***Internet Protocols (IP)*** *TCP/IP is the set of rules that govern computers to communicate on a network including the internet.*

Things one would require in order to get connected to the internet

- ***A computer****.*
- ***NIC****-Network Interface Card.*
- ***Modem****- Acronym for modulator demodulator. An electronic device that attaches to a computer and links that computer to the internet through a telephone link.*
- ***A physical connection*** *such as telephone line.*
- ***An internet service provider*** *(ISP) to supply the internet.*
- ***Internet software*** *- e.g. protocol to make Pcs compatible,*
- *Operating system enable configurations.*

Use of the internet as a learning tool

- *To search for information using search engines and directories*
- *E-mail system is used in collaborative learning*
- *Enables distance learning*
- *Discussions over educational chat rooms*
- *Enables downloading of relevant documents*
- *Computer Assisted Assessments (CAA) for online exams*
- *Use of electronic libraries and textbooks*
- *Assignments are received, done and sent across the network by the students*
- *Video conferencing is used to share views and ideas among students and teachers.*

Merits of internet in schools

- *A lot of information is obtained which is not available in a single textbook*
- *Updated or current information is obtained since internet is dynamic*
- *Learning is fun and easy as internet is exciting due to the multimedia content used.*
- *It offers different sources of information hence a Varity of opinions on a topic*
- *It's a quick way of getting information where internet connection is good*
- *It encourages group work through collaboration therefore sharing of information and experience among students and teachers*
- *Students are able to attend virtual classes*
- *Different skills such as typing, use of web browsers, problem solving-mail are developed through the use of internet*
- *Instant or timely communication is done by use of the E-mails system*
- *Shopping for item such as books is made easy and less expensive*

Disadvantages of the internet in schools

- *No information control over the internet such that all sorts of bad information is accessed*
- *There is no privacy of information and information piracy is common*
- *Indecent material is published on the internet*
- *It's not readily available to most people*

- ❖ *It is expensive and its access drains school resources*
- ❖ *Time is lost where internet speed is low due to poor links, hardware and congestion.*
- ❖ *Some sites give outdated therefore misleading information because they are not regularly updated.*
- ❖ *Time wasting occurs when students easily stray into non essential material*
- ❖ *Many internet sites have been commercialized*
- ❖ *Computer viruses are easily spread over the internet*
- ❖ *Difficult to obtain information relevant to a particular level of a student*
- ❖ *It is possible to obtain contradictory information*
- ❖ *Many students and even teachers do not have adequate skills of accessing the internet.*

Functions of the Internet

- *It enables the receiving and sending of electronic mails around the world. These mails are delivered instantly around the world.*
- *Downloading programs and other files from other the world*
- *Net banking (internet banking). This has replaced the conventional way banking.*
- *Now you can bank at any time of the day and in any place where you have an account.*
- *Enables online education- internet enables students to study from their areas.*
- *This has facilitated long distance earning. Students can now not only register and attend classes but also do examinations online.*
- *On-line employment system with job seekers can register and obtain information on vacancies with/from various companies e.g. data entry.*
- *E-Library (E-books) - Internet allows access to current and up-to-date reading texts, for instructors, teachers and students.*
- *Journals and Research literature- Internet allows one to have access to libraries and databases. A researcher therefore is able to review numerous journals and relevant up-to-date literature.*
- *Joint Research- Internet increases co-operation efforts in selected joint research project of common interest especially on basic technology e.g. use of telematic technologies in the field of telemedicine in the fight against major health scourges such as AIDS.*
- *News and information- Internet allows you to headlines and in-depth stories on everything as it/they happen. This is can be on politics, technology weather vagaries e.t.c. it's a virtual treasure of information. Any information on any topic under the sum by use of search engines.*
- *Newsgroups- News groups or electronic discussion groups allow people to discuss and exchange information on a vast array of topics.*
- *Finding people and organizations.*
- *Leisure and entertainment.*
- *Health- daily news about health care as well as a number of health resources.*
- *Shopping- Many online stores and sites that can be used to look for products and buy them using credit card. No need to leave the house.*
- *Online chat - makes new friends and meets new people and stay in touch with old ones.*

Disadvantages of the Internet

- *Pornography- This is a serious issue concerning the internet especially when it comes to young children. There are thousands of pornographic sites on the internet that can be easily found and can be a determinant to letting children use the internet.*

- *Moral and Cultural effects- cartoons and networks which facilitate access to pornography and other negative morals which has made fight against several problems of HIV/AIDS, bad sexual behaviors, drugs more complicated.*
- *Spamming- Sending of unsolicited e-mails in bulk which serve no purpose and un necessarily clog up the entire system.*
- *Personal Information- If you use the internet, your personal information such as; name, address etc. can be accessed by other people. The credit card information can also be got if at all it's used to shop online. This is akin to giving a blank cheque*
- *Ill Health- People who spend a lot of time of sitting in front of a computer. Radiation emitted by computer's screen is harmful to eyes. Sitting for along time is also harmful to the spine.*
- *Addiction - Some people can't just live without it. They have no real friends and when internet is down, they get furious. They live sedentary life styles.*
- *Costs- The initial costs of buying network hardware and software in addition to employing experts to do the work is very high.*
- *Virus- A virus is a program that disrupts the normal functioning of your computer system. Computers connected to the internet are more vulnerable/prone to virus attacks and they can end up into crashing the whole hard disk, causing undesirable effects.*
- *Spread of terrorism and drug trafficking- provides a rich recruitment for all illegal activities because of ease in communication.*

Outline three factors which determine data transmission speeds over the internet

- *The speed/type of the modem*
- *Distance from the central office.*
- *The quality of the phone line used.*
- *The amount of traffic on the internet/ number of users online..*
- *The power of the computer (processor speed).*
- *The software used (Browser or Operating system).*
- *The ISP-they may have too many modems without enough bandwidth*
- *Satellite – For those who use the satellite face different several problems, wind, rain, cloud cover, solar flares, satellite dish, poorly configured bandwidth.*

Mention services provided by the internet.

- *The world wide web*
- *E-mail*
- *Newsgroups*
- *Message boards*
- *Mailing lists*
- *Chat rooms*
- *Instant messaging*
- *Internet telephony*
- *Videoconferencing*
- *Gopher*
- *E-commerce*
- *E-learning*
- *Internet fax*
- *Health information on the net*
- *Music and entertainment*
- *Telnet*

Advantages of using cell phone for internet access

- *Portability*
- *Readily available*
- *Cheaper to use*
- *Immediate contact is possible*
- *Offer faster connections*
- *Time saving than crowded cafes*

Disadvantages

- *Can easily be lost*
- *Limited display of contents*
- *Large amount of data may not be downloaded*
- *Some phones can't browse certain websites*

Factors that leads to a slow internet download speed.

- *Quality of ISP.*
- *Age of computer set.*
- *Weather.*
- *Type of browser being used.*
- *Many pictures, animations, sounds and graphics on the page.*
- *Distance from the broadcasting device.*
- *Length of cable being used.*
- *Age and type of the network infrastructure used.*

Netiquette *→Behaves shown when on a network/internet →This is a set of rules and customs that is considered polite when communicating on internet*

Give three ways how you can exercise netiquette.

- *.Helping those seeking for answers on line.*
- *Log off your account after use.*
- *Never to search or post pornographic material (etc)*
- *Identifying yourself truly on internet*
- *Avoid clogging internet with unnecessary downloads and uploads.*
- *Avoid posting rude statements on line*
- *Avoid hacking into people's sites or information.*
- *Respect for other people's views, resources and time while online*
- *Control spread of virus*
- *Respect of human dignity*
- *Do not use the internet to insult or abuse others*
- *Never to use the internet to spread lies*

They involve the following practices *→Helping those seeking for answers online. →Signing out your account after use.→Never to search or post pornographic material.→Identifying yourself truly on internet →Downloading only necessary files in order to avoid clogging the internet.→Posting polite statements on line →Respect for one's site and information.→Subscribing to only sites you have researched on.→Never to search or post pornographic material.*

Netiquette for an e-mail service *♠Give the title/ subject of an email you are sending.♠Greet the recipient of the message.♠Write your message in sentence case not all in capital.♠Identify yourself truly to the recipient. ♠Use proper sentence structure ♠Make sure your e-mail includes a courteous ending.*

Netiquette for online group discussion *√Identify yourself with a name or handle √Give objective comments √Avoid bad language and have respect for other members √Keep the discussion on the topic available don't divert others*

What is an e-mail address?
Unique name that consists of a user name and domain name that identifies the user.e.g[*byaruhangagodfrey43@yahoo.com*](mailto:byaruhangagodfrey43@yahoo.com)

Parts of an E-mail Address

- ***Username;*** *for example Godfrey is a username in the email address* [*godfrey@yahoo.com*](mailto:godfrey@yahoo.com)*. It identifies the owner of the address.*
- ***@;*** *A symbol is read as'at'It separates the username from the other parts of the address*
- ***Server name;*** *for example yahoo in the address* [*godfrey@yahoo.com*](mailto:godfrey@yahoo.com)*. It indicates that the server computer that hosts the e-mail address for godfrey is yahoo. Other e-mail hosts or servers include Gmail by Google, hotmail, breakthrough*
- ***The period (.);*** *This is read as 'dot'. It is used to separate different parts of an e-mail address.*
- ***Domain name;*** *for example com, identifies the type of institution offering a particular service. For example com, co.uk, ac.ug, sc.ug and others. Some common domain names include:*

Example / parts of an Email address
[*Ugandan_teachers@yahoo.com*](mailto:Ugandan_teachers@yahoo.com)

- *Ugandan Teachers – user name*
- *@ (at) – Separator of user name from domain*
- *yahoo - the domain name (mail server)*
- *. (dot)*
- *com - indicates the type of organization*

try out this:[*desiregodfrey@gmail.com*](mailto:desiregodfrey@gmail.com)***.***

Explain The E-Mail Format Below
Subject*: carries the topic/theme/title/reason for the e-mail message*
To*: carries the e-mail address of the recipient.*
From: *This part carries the sender's e-mail address*
CC*: Enables copies of the E-mail message to be sent to the third party while acknowledging/showing other recipients.*
Where other addresses to receive copies of the same message are indicated.
BCC: *Enables copies of the e-mail message to be sent to the third party without acknowledging/showing/letting any other recipients (if present)*
Forward: *This enables one to send the received mail to another or other persons*
Delete:*This part enables one to ease the e-mail.*
Compose. *Is where one types the actual message?*
Attachment*: is a file /folder that can be included as part of your email message.*

Terms as used by e-mail account users.
Inbox: *Stores messages that have been sent to the E-mail account holder****Sign out:*** *Helps in safely logging out of the e-mail account*

Electronic -Mail:*is the transmission of message via a computer network or internet*
Advantages of electronic mails;
→*Reduces paper costs*

→Provides immediate delivery feedback.
→They offer provision for attachments.
→Secured by passwords.
→E-mails can be conveniently sent to multiple recipients.
→There is a possibility of multimedia mails where they can be received as voice mails and read aloud.
→Can easily go across many time zones (continents).

Disadvantages of electronic mails;
→E- mails introduces viruses
→E-mail is not secure i.e. snoopers and hackers can read it as it tallies along in the public ways that make up internet. In order that this problem is solved an Encryption code can be used. An Encryption is a software that scrambles the mail so that only those with proper encryption key can read it
→E-mails are not very private through tapings
→System overloads can cause unnecessary delays

Advantages Of E-Mail Over Ordinary Mail
→A message can be sent anywhere in the world at the price of a call without having to leave your seat.
→Speed of delivery. The message will arrive in few minutes and can be picked up the next time recipe ent looks at their e-mail.
→Ability to send multiple recipients. The message can be sent simultaneously to a group of people.
→ It is easy to send a reply to an e-mail as soon as it is received using a "reply" button.
→Large files such as spread sheets and graphics can be sent as attachments.
→An e-mail address is universal and ordinary mail, one has to change addresses wherever he or she is located.
→Assurance of whether the mail has been sent.
→Convenient when retrieving and delivering messages. →Some e-mail addresses are given free of charge. It is also free to send e-mails over the internet. Some servers like yahoo do not charge the sender.
→E-mails are more secure than the snail mail since it is only the owner who can access the inbox. They are password protected and they remain secretive unless the owner reveals it. →The messages can be received anywhere anytime especially now that e-mails can be accessed on phones →E-mails can be sent to multiple recipients simultaneously at the same cost or no cost at all.→It is a very efficient method of sending messages over long distances and to many people in a short time. →They are time saving for example one can travel abroad as the paper to present is being prepared at home and then later be sent to him instead of delaying in the name of waiting for it. →Very easy to send a reply as soon as it is received by using the reply button→No transport costs, no stamp costs, →Assurance on whether the mail has been delivered is always given as soon as it is delivered

Disadvantages of post office mail and electronic mail.

- ✔ *Delays on delivery in post*
- ✔ *E-mails work with power*
- ✔ *Some virus can be sent with e-mail*
- ✔ *There is a chance of altering the information in email*
- ✔ *There must be some content of constant network hence expensive*

- ✔ *Must be working with people with e-mail address*
- ✔ *Some e-mail address are given free of charge and no monthly fee as it is in post number*
- ✔ *Efficient and cheap method over long distance*
- ✔ *Easy to send a reply as soon as it is received by using the reply button*
- ✔ *Only those with internet connection can be e-mailed and those with e-mail addresses*
- ✔ *Some e-mail address are given free of charge and no monthly fee as it is in post number*
- ✔ *Efficient and cheap method over long distance*
- ✔ *Easy to send a reply as soon as it is received by using the reply button*
- ✔ *Requires some skills to be usedInternet connection and service is still expensive in some countries especially the developing countries*
- ✔ *They increase personal insecurity because the network can be hacked into and the communications be tapped (eavesdropping) into, which may put some individuals lives at risk*
- ✔ *The internet and the e-mails are good breeding grounds for viruses, which can be sent by malicious unscrupulous individuals.*
- ✔ *They don't suit rural African settings especially where electricity has to be used.*

TERMINOLOGIES ***Connection****. This is the actual process by which the browser contacts the server computer over the network****Surfing.*** *It means moving from place to place on the internet searching for topics on the internet.****Browsing****: means searching for particular or specific item on a Web A* ***Web browser*** *A program that fetches and displays web pages→A software program that fetches web pages from another computer and displays them to the user.→Software program that allows you access and view webpages. →Is an application program that can be used to view or load web pages*

Examples of browsers

- ✔ *Internet Explorer,*
- ✔ *Netscape Navigator,*
- ✔ *Mozilla Firefox.*
- ✔ *Opera mini*

Search engine.
→is a tool/program that allows a person to find specific documents by use of key word
www.e.g.google,yahoo, Ask, Excite

NOTE*: searching for any information on the internet is a challenging task to the user because you need to have the web address of the contents your looking for.so to simplify this, tools have been designed to help the user get whatever information your looking for without necessary knowing the web addresses. Such tools are called* ***Search Engines***

World Wide Web-*Also called the web consists of a worldwide collection of electronic doc.each of these doc on the web is called a web page*
Is a collection of electronic documents (web pages) that can be viewed or laid over the internetIt is a system of internet servers that support html documents.
It is a system of interlinked hypertext documents accessed via the internet

***A web site**: is a collection of related web pages*
***A web page:**pages that contains text, graphics, audio and video and hyperlink to other document or simplify a document on internet.*
***NB:** Each webpage on the web has a unique web address through which it can be accessed. This address is called**URL** -Unique address for a Web page*
***A home page**: is the starting page on a website.*
***Hyper Link**. A connection in a web page that sends you to another web page or resource*
***a hit"** Is Any Web site name that is listed as the result of a search**A hyperlink** is a connection in a web page that sends you to another web page Also called a link is a built-in connection to another related web page or part of a web page. A link can be a word, a phrase or an image.*
Web master**: this is a person who creates, maintains and manages a website often for a business organization.**Why webmasters are discouraged from adding many multimedia files on the webpages
→Delay the speed of page loading
*→They require a bigger storage space **Web-portal**: website that provides specialized services such as email, searching news updates financial updates, weather and links to selected websites.*
Is a web site which brings information together from various source in a uniform way.(usually each information source gets its dedicated area on the page for displaying information).
***Blog**: Sites generally used to post online diaries which may include discussion forums.*
*-A website with content cannot be edited by the general public **WIKI**-A site which users collaboratively edit its contente.g. Wikipedia→A software that allows users to freely create and edit contents of web pages using any web browser **Gopher**. A technology that is used to make files available over the Internet. It is a menu-based method of searching for information on the Internet.*
***A protocol**-A set of rules that govern the transfer of message between networks devices)*
***Client computer:** A computer that can access the resource on a network*
***Terminal:** This is the work station/client/computer from where data is sent or received*
***Cloud computing** The technology that enables us to store our files and applications on a central remote server so that we can access them any time, on every computer connected to the internet in every place we go*
***A chat room** is a location on an internet server that permits users to chat with each other by typing lines of text on the computer.*
***A newsgroup** also called a discussion group is an on line area where users conduct written discussions about a particular subject. To participate in a discussion, a user sends a message to the newsgroups and other users in the newsgroup read and reply the message. Is required to participate in a newsgroup, and most web browsers include a newsreader.*
***Instant messaging**-is a type of online chat which offers real-time text transmission over the internet.*
***Groupware** is a software application that helps groups of people work together and share information over a network.*
***A Videoconference** is a meeting between two or more people in geographically separated area who use*

a network or internet to transmit audio and video data

Band width. *→Refers to the maximum amount of data that a transmission medium can carry at a particular time. (It and is expressed in bits per second)*

→It is the rate of speed of data through a channel at a given point

→Is a term used to describe how much data you can send through a connection.

→The difference between the lowest and highest frequencies transmitted

Modem: *is the combination of two words.**Modulator**&**demodulator**.So a device that is capable of converting analog signals into digital signals (**modulating**) and can also convert digital signals into analog signals (**demodulating***

Cyber Crime:*-Any crime committed on a computer or committed using computers*

→Any crime that involves a computer and a N/W-Online illegal acts or internet based illegal acts

→Refers to the un authorized use of a computer set.

→Refers to the unlawful use of a computer set

Uses Of Websites

- ✔ *Good for advertisements and marketing of business*
- ✔ *Using a website for communication is faster and cheaper than using postal offices or radios*
- ✔ *Can help you to get some money due people who may bring their adverts to be uploaded for public.e.g.face book is visited by many people and this can attract businesses to advertise on it and the FB owner can earn some money*
- ✔ *Provides room for goods display, buying and selling of our goods online*
- ✔ *Improves on sales or business promotion*
- ✔ *Can help you sensitize your clients about the use of some goods they buy from your business and also keep on updating your customers*
- ✔ *It can help you win your competitor in one way or the other*
- ✔ *Can assist you when carrying out market research*
- ✔ *It offer cheap means of communication*
- ✔ *It enables one to have feedback from the public as they are allowed to comment online*

<u>Demerits</u>

- ✔ *It is costly to design and host*
- ✔ *It acts as source of conflict dues to different posts from someone to respond*
- ✔ *It is not effective in communication as it may take long for someone to respond.*
- ✔ *It is unreliable due influences of power shortage , internet coverage etc*
- ✔ *It can be hacked by malicious people and negative posts can be made*
- ✔

Ways how a website can be of importance to your school

- *For advertising the school*
- *Self checking i.e. comments from public*
- *Collaboration purposes*
- *E-learning*

- *Cheap means of communication.*
  Communication purpose

Ways how a website can be of a disadvantage to your school.

- ❖ *Costly to design and host*
- ❖ *Source of conflict due to different posts*
- ❖ *Not effective in communication.*
- ❖ *Subjected to influences of power shortage, internet coverage etc*
- ❖ *Can be hacked by malicious people.*

The Internet Service Providers

→Is a company or individual/bodies that sells/supplies Internet in form of Bandwidth for a monthly fee
→The Company that takes care of the technical aspects of connecting your computer to the internet

Examples of ISPs companies'*mtn, airtelwarid, utl*

Services offered by internet service providers (ISPs).

→Internet access
→Domain name registration
→Web hosting
→Managing traffics
→Provide backup storage of data
→Connect their clients to the internet by providing the necessary connectivity hardware and software.
→Invest in general internet access infrastructure like musts
→They do system analysis and consultancy
→Network servicing and maintenance
→Sale network hardware accessories and air time
→Provide network security and parental control systems.
→Social responsibility

Factors to consider when choosing ISP

- *Initial connection cost*
- *The subscription fees for the services*
- *The available band width*
- *Experience in the internet field*

Web/Videoconference*: is a meeting between two or more people in geographically separated area who use a network or internet to transmit audio and video data. It allows participants to collaborate as if they were in the same room*
It is used to conduct live meetings or presentations over the Internet/network. each participant sits at his or her own computer and is connected to other participants via the internet.

Video and audio conferencing is supported by a ***VOIP*** *(voice over internet protocol).a protocol that enables one computer or communication device to transmit a video or an audio signal to another*

device)

To carry out video conferencing, you need these items *→Microphone*
→Speaker
*→Web cam****And Videoconferencing software such as***

- *iChat,*
- *Skype*
- *,iVist,*
- *Gizmo etc),*
- *codec,*
- *modem*

MERITS

→Meeting can be recorded
→In case of limited classroom, this is the best method of teaching
→Cheaper than holding physical meeting like paying for rooms, seats and others→Equipments do not have to be carried around→Schools can call meeting at short notice→Do not have to pay for travelling→Do not have to pay for conference room facilities→Traveling time is saved
→Recording can be used for future reference
→It allows for voice call communications
→Communication involves users seeing their pictures on either machine →It saves us the risk & danger of flying/traveling→It makes it easier for the disabled people to attend since they may find it difficult to travel→Good and cheap for companies who have limited space/room

DEMERITS
→Communication may not be effective especially when some people are not close to the microphone
→Some tools are costly
→Creates a room for lies→Hardware Equipment can break down→Strength of signal /bandwidth can be a problem..!!

URL (Uniform Resource Locator) *Is an address that helps the browser to locate a particular web page or website. E.g. http://www.google.com helps one to access Google website. This is an address, which is typed in the address box to get a web page or website. The URL address specifies the document type, its name and the precise location on the internet. Every web page has a unique address. This address is what is known as the URL (Uniform Resource Locator).*

Examples of URLs*.http://www.google.comhttp://www.facebook.comhttp://www.youtube.comhttp://www.thesun.co.uk*

PARTS OF A URL ADDRESS

Protocol: *is a standard which guides transfer of documents on internet OR is a set of rules that governs communication between computers on a network*
WWW (World Wide Web). *This indicates the computer which is requesting for a service.* ***Server name:*** *this is the name of the computer on which the website is hosted.****Domain name:*** *the server name to be accessed*

Parts of a URL.

http:// www. Yahoo. Com

1 2 31= mode of accessing the site (protocol)2=Domain name (the server name to be accessed)3= Designation for the site (*the name of the company being accessed)*

EXAMPLE 1

.*http://www.godfrey/countries/uganda.org*

Http *(****Hyper Text transfer protocol****-).→ defines the protocol by which to access the web page A set of rules for exchanging files (text, graphic images, sound, and video) on the web. www.godfrey.org. identifies → the domain name of the computer (server) where the webpage resides. In this case the server is located at Godfrey****Countries****.→ Represents the path of the URL****Uganda****. → Is the document name that is currently opened?****Org (organization)*** *→Top level domain in* ***URLN.B: http*** *stands for hyper text transfer Protocol, which is a standard that enables pages to transfer on the web. The address that you will use to locate or identify the location of files .it contains protocol, host name, search engine and sometimes the filename.****Domain Name****. It is the identifier of computers connected to the internet*

There two types of domains1. *Top level domain e.g****.com.2****. Second level Domain e.g.co.uk,.com.ac.gov.ac*

- ***.edu*****----------** *educational institution*
- ***.gov*****----------** *government institution*
- ***.org*****----------** *Non-governmental organization*
- ***.mil*****----------** *military institution*
- ***.com*****----------** *Commercial organization*
- ***.co*****----------** *Company*
- ***.sc*****----------** *school*
- ***.ac*****----------** *academic institution especially higher learning*
- ***.net*** **----------** *internet service provider*

In some instances another two letter extension is added after the domain name to show the country where the website is located. For example;

- ***.ug*** *Uganda*
- ***.au*** *Australia*
- ***.br*** *Brazil*
- ***.ca*** *Canada*
- ***.cn*** *China*
- ***.eg*** *Egypt*
- ***.de*** *Germany*
- ***.fr*** *France*
- ***.in*** *India*
- ***.il*** *Israel*

- ***.it*** *Italy*
- ***.jp*** *Japan*
- ***.ke*** *Kenya*
- ***.mx*** *Mexico*
- ***.za*** *South Africa*
- ***.uk*** *United Kingdom*
- ***.tz*** *Tanzania*
- ***.com*** *United States*

Show one way in which the internet can be a danger to.Morality*-Pornographic sites on the internet can determinant to increase immorality, bad sexual behaviors among others* ***-Labour****-agroup /class of people may be left out in the field of e-commerce and business****System Security****. Hackers and crackers are a big danger to information & computer system****Human Security****. With internet information has no private guarantee (hacker's Vs crackers)****Protocol*** *→Is a set of rules that govern the transfer of message on a network/Internet.→Is a set of rules that governs communications between computers on a network*

<u>Computers Can Communicate With One Another Through;</u>

The Transmission Control Protocol / Internet Protocol (TCP/IP)
is a suite of protocols used to communicate across the Internet.
A set of rules used to send data between computers over the Internet.
→ ***IP*** *– Handles the actual delivery of data An IP is number assigned to any Internet-connected computer. E.g. 216.200.47.93*
→ ***TCP*** *– keeps track of packets (divided message) for efficient routing through the Internet.*
SMTP *(Simple mail transfer protocol) Used when sending electronic mails (message) over the internet/network*
SFTP *(Secure file transfer protocol) This provide secure files transfer, access and management over a network*
POP *(Post Office Protocol) Used by local email client to get emails from the server over transmission control protocol*

TELNET (Telephone Network) *Protocol that is used by telephones for interactive text-oriented communication. It allows inputting commands and running programs.*

File Transfer Protocol (FTP).
→is an internet standard that allows users to upload and download files with other computers
-Is a set of rules which enable transfer of files from one computer to another.
- enables transfer files from a server computer to a client computer and vice versa.
-Helps in uploading and downloading files.
Internet-work Packet Exchange (IPX).*A LAN communication protocol used to move data between Server and workstation programs running on different network node****s.***
Sequenced Packet Exchange (SPX).*A protocol developed to provide in-sequential data transfer for communicating from a workstation to a file server or another workstation.*
Internet-work Packet Exchange (IPX).*A LAN communication protocol used to move data between Server and workstation programs running on different network nodes.*
Sequenced Packet Exchange (SPX).*A protocol developed to provide in-sequential data transfer for communicating from a workstation to a file server or another workstation.*

Hypertext Transfer Protocol (HTTP).*A set of rules for exchanging files (text, graphic images, sound, video) on the web.*
Hypertextext transfer protocol secure (HTTPS).*Protocol used on internet or on network with several activities taking place for secure access FTP (File Transfer Protocol) Used when exchanging files on a network*

DATA COMMUNICATION.*It refers to the process of transmitting data signals from one point to another through a network. It's a process through which the signals are sent out through a channel to between communicating computing devices*
→Sending and receiving information through a communication media

Elements of data communication

Sender (sending device)
Receiving (receiving device)
Messenger
Transmission medium
Protocol

Transmission medium.-*This is a communication channel or path over which data signal are sent.e.g.either physical (cable) or wireless (waves)→Means through which data travels from a device to another on the network.****Communication device/signal converter.****This is a device that converts the data or instructions from the sending device into signal that can be carried by a transmission medium to the receiver.e.g.MODEM*

Types of data communication tools

- ***Phones***
- ***Emails***
- ***Social Network***
- ***Instant messaging***
- ***Analog signal-****continuous signal*
- ***Digital signal-****discrete/discontinuous*

Types of transmission media (Categories of communication media)

- *Bounded/Guided media/physical (wired)*
- *Unbounded/Unguided (Wireless)*

Bounded/Guided Media

In bounded media, data signals are transmitted from source to destination through a restricted or definite pathway such as a cable.

There are several types of bounded media but the common ones are:-

- *2-wire open line cables*
- *Twisted pair cables*
- *Coaxial cables*
- *Fiber optic cables*

They are two types of twisted pair cables:-

- *UTP (Unshielded Twisted Pair)*
- *STP (Shielded Twisted Pair)*

This consists of four pairs of twisted wires enclosed in one outer jacket.

Advantages of unshielded twisted pair

- *It is of low cost*
- *Small in size*
- *Easy to install*
- *It's the most popular and the best for LANs*

Disadvantages

- *Subject to interference*
- *Covers limited distance; usually 100 meters*

Advantages of Coaxial cables

- *Stable even under high loads*
- *Used for longer distances (300 – 600 meters)*
- *Transmits faster than twisted pair.*
- *It has a larger bandwidth of up to 1Gbps*
- *Can carry voice, data and video simultaneously*
- *More resistant to radio and electromagnetic because it's heavily insulated.*

Disadvantages of coaxial cables

- *Thick coaxial is hard to work with. It is heavy and bulky*
- *Relatively expensive to buy and install as compared to twisted pair.*

Advantages of Fiber Optic Cabling

- *It is immune (resistant) from electromagnetic interference (e.m.i.) and eavesdropping.*
- *It is fast and supports high bandwidth*
- *It can cover long distances because it has low attenuation*
- *It can be used in hazardous places like highly flammable areas and water because they do not generate electric signals.*
- *It is smaller and lighter that copper cables hence ideal for space limited situations.*
- *They are non flammable because no electricity passes through them*
- *Much secure because it may not be easy to intercept light signals by unauthorized people*

Disadvantages

- *Connectivity devices and media are expensive*
- *Installation is difficult because the cable must be handled carefully*
- *It is relatively complex to configure or set up*
- *A broken section is difficult and expensive to repair.*

Unguided/ Unbounded Media/ Wireless media

Wireless/unbounded/unguided media is the type of media that are used to transmit data from one point to another without using physical connections.

It refers to data signals that flow through the air. They are not guided or bound to a particular channel to follow.
Wireless communication is more convenient than installing cables but it has a slower data transfer and it is subject to interference.

Advantages of using wireless technology

Wireless technology overcome inconvenience of using too many wires for communication
Wireless is appropriate to use in places where cabling is practically impossible.
Fast data transfer rates are possible where there are no environmental obstacles.
Wireless increases flexibility and mobility at the work place because workers can sit anywhere with their computers without being limited by the extent of cable connections.
Wireless technology makes it easy to set up temporary network installations.
Provides high-speed communication transmission.
No need to install cable.
Lower installation and maintenance costs.

Dis-Advantages of using wireless technology

Poor security of data on a wireless net work, outsiders can easily log on an unsecured wireless network
They are prone to electrical interference from lights and radios
They are subject to obstructions such as walls.
In general they have a limited range. Signal strength decrease as the range increases.
Limited to line-of-sight transmission
May be affected by temporary atmospheric disturbances

This communication is usually facilitated by a transmitting antenna and a receiver aerial. Examples of wireless media include:-

- *Microwaves*
- *Radio waves*
- *Infrared waves*
- *Visible light*
- *Communication satellite*
- *Ultra-violet rays*
- *X-rays*
- *Gamma rays*
- *Bluetooth*

Microwaves *are high frequency radio waves that are sent through the atmosphere and space to deliver telecommunications services, including TV distributionMicrowave antennas are usually placed on top of building, towers, hills, and mountain peaks to avoid obstructions.*
Microwave transmissions use parabolic antenna and dishes that produce a narrow.
Highly directional signal
Merits

They are more easily focused into narrow beams than radio waves to ease the point to point telecommunication.
Their comparatively higher frequencies allow broadband width and high data flow. And also use of smaller antenna sizes since (the higher the frequency the smaller the antenna size).
Limitations
Subjected to atmospheric interference
Can be exposed to electronic eavesdropping.

Infrared *uses electromagnetic waves for transmission. It has a smaller wavelength than radio waves. It works within few feet if nothing is obstructing. An example is a TV remote control.*

Satellite *is a microwave station placed in the outer space. The satellite receives a signal from the earth and rebroadcasts it at a different frequency to any number of earth base stations.*

Blue tooth*-Short range wireless technology standard for exchanging data over short distances for fixed and mobile devices, creating* ***PAN.*** *A small chip (Bluetooth card) must be installed in the device to enable it communicate with others*

WI-FI (Wireless Fidelity)*. Is a popular technology that allows an electronic device to exchange data wirelessly (Using radio waves) over a computer network including high-speed internet connections?*
Merits. *Cheaper deployment of LAN .Also spaces where cables cannot be run.*
Demerits
Have limited range.
High power consumption
Interference
Security risks
The practical range of WI-FI does not favor mobile device

Satellite (broadcasting transmission)
→Satellites are communication devices stationed in space and microwave radio as their telecommunications medium to communicate with the earth based communication facilities.
→Satellite are capable of receiving and relaying voice , data, and TV signals to and from earth based communication facilities (earth station) that use parabolic antennas (satellite dishes) to communicate with the satellites.
→Satellite microwave communication is flexible and possible with most remote sites and with mobile devices, because no cables are required, which enables transmission with ships at sea and motor vehicles
→ ***Satellites****: receives microwaves signals from the ground or earth, amplifies them and finally sends them back to many others earth station.→A satellite is put in space above the ground where the gravitational force is very low and it keeps on rotating in an orbit.*
→This means that it is placed in outer space. And that it receives signals from the earth, amplifies it, and then rebroadcast it at a different frequency to any number of earth based stations.

ADVANTAGES OF SATELLITE COMMUNICATIONS? *→There is less limitation as to the origin and destination of a transmission, which can originate from any point and be received at any point*

within the coverage of the satellite. *→ There are no obstructions, and transmission is not subject to the terrain problems faced by landlines.*
→ High bandwidth of several Megabytes per second can be enjoyed.
→ Thousands of people can simultaneously talk through telephones using a single satellite.
→ There is no sea or ocean to hinder satellite transmission and distance is not significant.
→ The cost of providing satellite communications does not depend on distance.
→ They can reach every corner of the world, even the most remote areas.

There are two basic transmission techniques for separating the groups of bits**Asynchronous** *transmission transmits one byte at a time over a line at random intervals.***Synchronous** *transmission transmits groups of bytes simultaneously at regular intervals*

Factors to consider when choosing a communication/transmission media

- *Speed of data transmission*
- *Cost of media*
- *Installation cost*
- *Data security*
- *Company/country policy*
- *Availability in the market*

Bandwidth *refers to the maximum amount of data that a transmission medium can carry at a particular time. It is the rate of speed of data through a channel at a given point*

Define data transmission media.
A means through which data travels from a device to another on the network.

Give one example of transmission media.

- *Twisted pair cable (wired)*
- *Coaxial cable*
- *Fiber optics*
- *Wireless*

Computer network*The collection of computers and other hardware devices linked/connected together for the purpose communication and sharing resourcesThe computers on a network must be linked by a medium such as cables, a wireless device or a telecommunication system in order to exchange dataThe network may be limited to a group of users in* ***LAN*** *or* ***WAN*** *covering several cities or regions, may also cover the entire world as the internet does.*

Intranet: *an internal network of an organization*
Extranets: *This is an intranet that extends to authorize users outside the company e.g.*
NB.A stand alone computer: *Is the one which is not connected to any other computer.*

Functions /Advantages / Purpose of Networking Computers

- *It saves funds due Resource sharing such as printers and software,*
- *Remote communication between devices (facebook,IM,chat room)*
- *Distribution of processing facility (data can be processed in different computers but stored on one computer server)*
  Enable data communication

It facilitate easy communications .e.g. emails
Ensure security of data by putting in place administrative controls over network
Allows for tight control over who has access to data in the system
Enables sharing of data, information and files. stored on any other computer on the network
It enables online learning and collaborative research
It allows access to free common data base and databank like free software and ATM service
Updating of software is easy since it's done together at ago on a server
Enables centralized administration, control and monitoring of individual users on the network
Enables workgroup computing. Workgroup software allows many users to work on a document or project concurrently
Networks provide a very rapid method for sharing and transferring files instead of using a time consuming method of using movable disks to transfer data from one computer to the other
Flexibility access. Users can log on and access their work from any workstation on the network.
Improvements in entertainments (games
The cost of buying equipment can reduce drastically since one printer can serve the whole organization, software resources can be shared instead of buying for each pc
Backup becomes easy. Instead of asking every user to back up their data the administrator will quickly do it using the network.
Negative implications/disadvantages/ Problems of Using Networks *→It is more costly running computers on a network than stand alone computers. Examples of resources that can be shared across a network (Printers, Files and folders, Programs/software)*
→Networks are more vulnerable to virus attacks than stand alone computers
→Require skilled knowledge and expertise because very many issues arise with network usage →They are vulnerable to frequent crashes
→High maintenance costs in terms of software costs and hardware replacement.
→Initial cost of installing a network on cables, network cards and software are expensive. And the installation may require the services of a ***technician***
→It requires administrative time and expertise for proper maintenance of a network which leads to additional cost
→Time can be wasted on social networks instead of doing meaning work
→The entire network fails if the server crashes/damaged. When this happens, the entire organization loses access to necessary programs and files
→There is increased risk of data corruption since many users will be using the system to access the same documents, some of whom may be careless or deliberately tamper with it
→Increased exposure to hackers which puts private data at risk..!!
→There is a greater risk from viruses because; they are easily spread between the computers that are part of the ***LAN***
→The break in the communication channel can stop the entire network.
→If one server breaks down may affect a number of computers due to over Dependency on the main file server
→It is vulnerable to hackers and viruses. If a computer is a standalone, physical access becomes necessary for any kind of data theft.however,if a computer is on a network, a computer hacker can get illegal access

Cabling and installation may be expensive
Increased dishonest .every day people lie to @other
It has killed face to face communication
Delay in some operation due to sharing (sharing of a device like a printer)
Some networks have spoilt some society values and morals
Wrong information on a network
Increased isolation of people (lock themselves in a room and spend days alone)

Factors an IT professional can consider before setting a computer network for an organization/School (Factors TO consider before setting up a computer network)

- *Cost of installation.*
- *Number of computers and other devices.*
- *Purpose of the network.*
- *Nature of s/w to be used*
- *Network topology*
- *Security*
- *The size of the room where the network is to be established*
- *Distance of connectivity.*
- *Personnel provisions/technicalities involved.*
- *Ease in accessing the network/ speed on the network.*
- *Future growth of the organization and expansion of the network.*
- *The technicalities involved in the setting the network*
- *Number of computer and other hardware devices to be connected*
- *Communication medium to be used such as cabling system or wireless technology*
- *The bandwidth to be used on network*

Requirements /components of setting up computer network

- *Computers/client/workstation*
- *Network hardware devices (network card)*
- *Transmission or communication (network) media/channels*
- *Network software (network protocol)*
- *Server.*

Computers/client/workstations.-*These are other computers on the Network (except the server) that sends request to the server.They are computers on the network that receive responses from server. They are also referred to as workstation*

State two factors you would consider when choosing a data communication mode. *→Cost→Nature of data→Data transmission speed→Safety of the mode→Availability to both the sender and receiver→Effectiveness and efficiency of the mode Vs. noise.*

Write any two factors to consider before choosing a local area network model

- *Number of users or size of the organization*
- *Nature of the organization*
- *Level of data security required*
- *Networking budget*

- *Level of administrative support.*

Factors affecting communication speed on the network.

- *Transmission (Frequency and band width).*
- *Line configuration (point to point and multi point).*
- *Serial and parallel transmission (serial data transmission and parallel data transmission).*
- *Direction of transmission flow (simplex, half duplex and full duplex).*
- *Transmission mode (Asynchrones versus synchronous).*
- *Packet switching (Getting more data on a network)*
- *Protocols (the rules of data transmission).*
- *Types of processor.*

→Transfer rate.→Network topology.→Computer memory →Capacity of hardware. →Heavy internet traffic.→Bandwidth. →The server →Computer processor speed →Distance the data travels: Malware, spyware and viruses:

→Modem speed →Natural condition →Hardware problems →Software problems →Memory available →Technological circumstances →Cookies:

<u>Network hardware devices</u>

- *Hubs*
- *Network interface card (NICs)*
- *Switches*
- *Routers*
- *Repeaters*
- *Bridges*
- *Mode*

Terminologies of Devices Used In Networking

Client. *This is a computer that is requesting for some information e.g. A web page from another computer.*
Server *this is a computer that actually services the requests of other computers. It is also known as host..****Firewall.*** *It may mean a software or hardware that provides necessary protection of one's network against intruders*
→Hardware or software for Save guarding against intruders on network
→Is a general term that refers to both hardware/software used to restrict access to data and information on a network?
Multiplexer: *distributes a single channel to several/different sections or departments*
Gateway: *allows two networks of different configurations to communicate with one another.*
Bridge. *It is a device used to establish a connection/communication between different networks*
Switches: *is a device that allows interconnection of computers to form a network.*
Hubs/ concentrator: *It is a component on which computers are interconnected to form a network.*
-device that connects multiple devices to the network and its function is to send and receive signals along the network between the devices. It services as a central meeting place for cables from computers, servers and peripherals on the network.
NICs.*This is a device in a computer that acts as a connection point between the computer and transmission media*
-a network card, network adapter or ***NIC*** *is a piece of computer hardware designed to allow computers to physically access a networking medium.*
NB.*some****NICS*** *are inbuilt on the motherboard while others built on a circuit board fitting into an expansion slot inside the computer the type of* ***NIC*** *determines the speed and performance of a network*
Routers-*device that links one network to other physically and logically separated networks.Is a device that determines a shortest possible route for data signal to follow.*
Repeater *amplifies data transmission signals to enable them move faster along a communication channel*
*-a device used to amplify signals along a communication channel to create long- distance networks by placing it between two segments of the network channels to overcome distance limitations****a standalone computer:*** *is the one which is not connected to any other computer.*
Node *it's a device that is connected as part f computer network. Nodes can be computers,*
Dumb terminal*: this is a computer system that is not capable of running its own programs but can interact with other computers via a network.*
Fax*. A facsimile (fax) machine is a device that transmits and receives documents over telephone lines. Documents sent or received with a fax machine are known as* ***faxes****. Fax capability can also be added to the computer using a fax modem.*
Modem: *This is an acronym for Modulator Demodulator. It converts analog signals to digital and vice versa.*

State two functions of a network administrator in an organization.
→Network administrators are responsible for building, maintaining, managing, and repairing an organization's computer networks.
→Network administrators handle a company's Local Area Networks (LANs), Wide Area
→Networks (WANs) and network segments, as well as manage the company's Internet and intranet systems.
→They install and maintain hardware and software that supports an organization's networks, making sure everything is working the way it is supposed to be.
→Network administrators keep a sharp eye on network performance, taking steps to ensure user's needs are being met and repairing any problems that crop up.
→Network security is also a vital component of a network administrator's work, as they must establish a means of protecting the organization's networks from hackers and other threats.

TRANSMISSION MODES
The direction in which data flows along transmission media is characterized as

- *Simplex*
- *Half-duplex*
- *Full-duplex*
- *Multi-plex*

Simplex *data is sent in one direction only.e.g. TV broadcasting.*
Half-Duplex. *It allows data transmission in either direction but only one way at a time.e.g. Fax machines; police radios calls, credit card verification systems and automatic teller machines*
Full-Duplex *.here data can flow in both directions at the same time. A regular telephone line, .*
Multiplex. *Several different types of signals can be carried at once through the same line. E.g. during video calls text audio and video can be multiplexed over the same line.*

TYPES OF NETWORK SERVERS.

File server: *One that stores various files and making them available to network user*
Application server: *Stores application software packages that run directly on it and made for user on the network*
Printer server: *A control computer that manages a networked printer from a single location*
Web server: *It allows users to access outside networks also providing web content/web pages to users.*
Mail server: *Manages mails by receiving moving and storing mail on the network.*
Proxy service: *A computer placed between a* ***LAN*** *and an external server or networks (internet) to restrict access to data.*

State three threats faced by organizations as a result of computer networking.

- *Virus attacks*
- *Theft of hardware and software*
- *Acts of terrorism or malice*
- *Theft of ICT time.*
- *Poor servicing and repair*
- *Poor electrical installations and earthlining*

TYPES OF NETWORKS

Local area network (LAN)
Metropolitan network (MAN)
Wide area network (WAN)
Wireless local network (WLAN)
Wireless wide area network (WWAN).

The type of a network depends on where computers and other services are located

Local Area Network*: type of a net work that covers a small area like building or two buildings.*
It can be physically or wireless set up (WLAN).
Wireless local area network uses a technology known as WI-FI. Technology is known as a ***wireless access point***

Advantages of WLAN over LAN

WLAN is cheap because there is no need of buying cables
Best for temporary network
Very good in hard areas like rural and mountains
Can serve a wide area since there is no cabling
It's a flexible network whereby the user can leave one place in the working area to another and still access the network

Disadvantages

It is not speedy
Can be affected by environment especially when there are tall buildings
It is complex when setting it up
Ca be affected by hackers since people around can access using their PCs

.***Wide Area Network (WAN):***
A Network that covers a large geographical area.
*WANs consist of two or more LANs connected through public networks such as Telephone lines, satellites, etc. the largest WAN is the Internet.****NB****: Computers are often connected to WAN via public networks such as the telephone system or by dedicated line or satellites.*

Merits of installing a school network

Speed in sharing and transferring of files
Cost compared to buying individual licensed copies
Security files on a network can be safe due to passwords
Sharing of resources like printers fax machines, modems scanners
Electronic mails can enable students to communicates with teachers and peers at their own schools
Flexible access .allow students to access their files from computers

Demerits

Expensive to install

Requires administrative time (proper maintenance of experts)
Must monitor security issues

Characteristics Of WANs
It is capable of covering a very wide area It is often used to interconnect several MANs and LANs It is slower than LANs and MANs because of the greater distance they cover. It is more prone to errors than LANs and MANs

Network Models
Is a description of how network layers interact?

Client server:
This is a network in which there is a central computer called ***server*** *that directs all the resources being shared to the other computers called CLIENT or NODES or workstations on the Network:*

Merits

Its offers a reliable centralized storage and sharing of files
It ensures high security of the network through access control installed on the server
it's easy to monitor the network performance on the server
it's cheap to install software which can be done on the server a lone instead of all computers on the network
It is secure because of centralized administration
It is cheap to setup since all computers connect to the same machine.
Monitoring and controls are done once for all devices
There is no data duplication since the same file is shared by all on the network
Privacy of one's data is ensured by creation of individual drives on the server.
Data access is faster because of known source.

Demerits

Extra expenses on buying a server computer
The speed of the network depends on the speed of the server machine
In case of server failure, the entire network goes down
There are a lot of delays since all computers are accessing the same machine
In case of hacking of the server all organization's information is at risk

Peer to peer (P2P
This is a network where computers are connected directly to each other without relying on a server.

Merits
It's very easy to set up
It's appropriate in case of a small network (few computers)
Inexpensive to set up and maintain
Its flexible
It is reliable since the failure of one computer does not affect the network
It is fast since tasks are shared by all devices.

Demerits

It lacks security due to absence of a server
There is no central administration
It is expensive in terms of networking equipment
It is insecure because of scattered information on all computers
It encourages data duplication which takes up storage space.
There is no privacy of information since all computers are open for every ones access
It is hard to administer without centralized control.

Merits of peer –to-peer over client-to-server relationship

→Less initial expense- no need for a dedicated service

→Setup-and OS [windows XP] already in place may only need to be reconfigured for p2p operation

Network Software

A *network's performance is determined by network software. Network software includes:*

- *Network Operating system*
- *Network Protocols*
- *Network Application software*

Network Operating System

These are operating systems specifically designed to optimize the networked computer's ability to respond to service requests

Functions of Network OS

- *Provides access to network resources like printers, fax, folders etc.*
- *Enables nodes on the network to communicate with each other more efficiently*
- *Responds to requests from application programs running on the network.*
- *Supports network services like network card drivers and protocols*
- *Implementing network security features like passwords.*
- *Error detection and control*

Network Protocols

These are sets of rules and procedures that govern communication (transmission) between components on a network.

. ***The Principle Functions Of Protocols In A Network Include****:*

- *Identifying each device in the communication path*
- *Securing attention of the other device*
- *Verifying correct receipt of the transmitted message*
- *Determining that a message requires retransmission if it is in incomplete or has errors*
- *Performing recovery when errors occur*

The nature and characteristics of Networks and Connectivity.

The following characteristics differentiate one network from the other:
Topology – the physical arrangement of devices.
Protocols - the rules and encoding specifications for sending data

Media – the cables that connect the devices e.g. Twisted-pair wire, coaxial or fiber optic cables

Network Topology

A network topology refers to the physical arrangement of local Area Network devices (nodes) in a communication network.

*There are two methods of connecting**physical topology** and **logical topology***

***Physical topology:** is the Arrangement of cables, computer, and other peripheral devices in relation to each other on a net work.*

***Logical topology.** Is the method used to pass information between workstation on a network?*

There are

- *Star topology*
- *Bus topology*
- *Ring topology*
- *Mesh topology*
- *Tree/ Hierarchical topology*
- *Hybrid topology*
- *Point to Point topology*

Bus Topology**It consists of a single central cable that connects all computers and other devices together called a **backbone** or **Bus

Advantages of Bus Network:

Cheap and easy to install
Computers can be attached and detached without disturbing the rest of the network.
Failure of one device cannot affect the network.
It's good for smaller networks not requiring higher speeds
Requires less cable length than a star topology
Easy to add new workstations on the network
Easy to connect a computer or peripheral
It has high transmission speed if coaxial cable is used

Disadvantages of Bus Network

If the bus itself fails, the entire network will not work.
If more data flows, the network slows down.
Its Limited in size and speed
Its less secure since all data is transmitted by only one main cable
The transmission slows down as more workstation are added

***Ring Network**A ring topology consists of a cable forming a closed ring or loop. (Ring/cycle shaped) Topology where all devices on the network are connected to one another in the shape of a closed loop, so that each device is connected directly to two other devices, one on each side of it to form a ring. Each data packet is sent around the ring until it reaches its final destination.*

Advantages of Ring Network

-It can cover a large distance.
-The speed of data transmission is high since each workstation can boast the signal
-No collision of data occurs as data travels in one direction only.
- Its orderly network where every device has access to the token and the opportunity to transmit

- Its Performs better than astar topology under heavy network load
- Cheap to install since there is only one cable between each workstation.

Disadvantages of Ring Network

-More difficult to install.
-If the cable fails, the whole network goes down
- Network adapter card are expensive
-Moves, additions and changes of devices affect the entire network.

Star Network:
*All computers and devices connect to a central Hub / switch. Data transmitted passes through the hub***Advantages of Star Network**
-Easy to install and maintain.
-Devices can be added and removed without disruption.
-Reliable because each device connects directly to the hub.
- Its best for large networks
- If one cable or station fails, the entire network is not affected
- High speed transmission is possible since each station has a dedicated cable
- Greater security as connection from one station to server is unique.
*- No disruptions to the network when connecting or removing devices***Disadvantages of Star Networks**
-If the hub fails, the entire network will fail.-Expensive to install.- Requires more cable length than a bus topology.-If the cable fails the workstation cannot receive data via any other route- if the hub or switch fails, attached are disabled

Tree topology
A tree topology combines characteristics of bus and star topologies;
Advantages of Tree topology *Allows for point-to-point wiring for individual segments*
*Supported by (compatible with).several hardware and software***Disadvantages of tree topology**
Overall length of each segment is limited by the type of cabling used.If the backbone line breaks, the entire segment goes down.More difficult to configure and wire than other topologies.

Hierarchical topology
*It is like the extended star topology, except computer controls traffic instead of a hub or switch***Mesh topology**
This is a network where each device has its own connections to all other devices on the network.
It provides each device with a point- to- point connection to every other device in the network.
Advantages of mesh topology.*If there are other possible routes through the network, the damage of one or several cables or computers may not have vital impact except the involved computers*
*Mesh networks provide redundancy, in the event of a link failure, meshed networks enables data to be routed through any other site connected to the network.***Disadvantages of mesh topology**
*It's the most expensive and difficult to maintain because each device has a point-to-point connection to every other device. The damage of at least one cable or device may damage the network seriously if there are only few cables in the network.***Hybrid Networks:**
*These are a combination of Star, Ring and Bus networks.***Considerations when choosing a topology***:*
Money. Length of cable needed. Future growth. Cable types

DEFINE THE FOLLOWING TERM.

System security.*Acts and omissions taken to secure information systems against losses or damage****.***
Encryption: Writing *a document in a special code for discriminated reading.*
Phishing.*An act of tricking people into giving secret information.*
Eavesdropping*: Involves listening secretly to a communication on line.*
Computer crime*Any criminal activities which involve the use of* ***ICT*** *to gain illegal or unauthorized access to access a computer system with intent of damaging, deleting or altering computer data*
Hacking*: Braking into ones computer with malicious intentions.*
Asynchronous: *Networking technology that parcels data into byte cells or 8-bits packets for easy transmission over communication media*
Password .*Is a combination of characters associated with a user name that allows a user to access a computer or a network.*

State three ways to one can make a password more secure.

- Do not share your password with others.
- Do not write your password down.
- Change your password frequently.
- At least do use 8 characters if supported by the system.
- use a combination of mixed case letters and digits.
- do not use your name, birth day, ID card number or telephone number
- do not use a password of all digits or the same letter.

State three threats faced by organizations as a result of computer networking.

- *Virus attacks*
- *Theft of hardware and software*
- *Acts of terrorism or malice*
- *Theft of ICT time.*
- *Poor servicing and repair*
- *Poor electrical installations and earthling*
- *Hacking*
- *Cracking*
- *Phishing*

Identify two ways someone's data on a computer can be misused

- *Data can be deleted.*
- *Data can be used to crack other systems.*
- *Can be used for masquerading.*
- *Data can be encrypted.*
- *Unauthorized sharing.*
- *It can be pirated*
- *It can be duplicated.*
- *It can be altere*

. In three ways how can you protect your data on the PC from being misused

- *Use of passwords and user accounts*
- *Data encryption*
- *Use of physical protection*
- *Install anti-virus*
- *Establishment of rules*
- *Use of centralized administration*

State three measures that can be taken to ensure safety of organizational and personal data and programs.

- *Constant backups for plan B just in case disasters occur*
- *Securing computer installation rooms with lock and key systems, burglar proof systems, non leaking roofs and others, etc.*
- *Have disaster recovery plans and sensitization*
- *Avoiding sharing of PINs and processed devices.*

State two forms of disaster that can befall computer systems and installations.

- *Fire out breaks*
- *Water from leaking roofs*
- *Lightening*
- *Acts of terrorism*
- *Robbery*
- *Collapsing buildings and tables*

A student stored a document on his computer. Later on, he found out that the document could not open. Give two possible causes for this.

→It could have been eaten by a virus
→He could have tried to open it in a different format
→May be the storage device could have crashed

State two precautions the student should have taken to ensure that his work was not lost.

→Should have scanned his computer periodically
→Always use the collect program when opening a file
→Follow the right procedures of shouting down system

256 School restricts the use of removable media such as flash disks, Compact Discs etc.State two reasons for doing this?

- ✔ *To avoid the spread of viruses that could come with those storages*
- ✔ *Limiting of influx material that could be on those storages like pornography*
- ✔ *Students may carry some information that are confidential like exams*

Mention two ways the school can improve security of its softcopy data.

- ✔ *By use of password*
- ✔ *By use of firewall*
- ✔ *By creating different account users*

COMPUTER VIRUSES, WORMS AND BUGS

Computer virus*: a piece of malicious software deigned to infect/affect a computer system performance*
→A program designed to disrupt the normal functionality of a computer→It is designed to infect and affect the computer's performance negatively.
→A computer virus is a computer program/code that copies (can copy) itself and infects a computer without the knowledge of the user.→A computer program/code specifically designed to damage or cause irregular behavior in other programs on a computer.

Types of Viruses***Boot sector virus****: this destroys the booting information and causes boot failure*
File virus*: these attach themselves on computer files and corrupt or delete them*
Hoax viruses: *These are internet based illusion/lies that are malicious*
Trojan/Trojan horse*: this is a program code that hides its identify in legitimate software*
Worms*: these are programs that stick in a computer memory and replicate to fill it up*
Backdoor*: these are programs that allow hidden access to a computer system*
Droppers*: these are programs that have been written to perform useful tasks but end up introducing virus in the process of performing their functions*

***Failed viruses**: these are viruses that have failed to meet their goals*
***Packagers:** these hide the existence of a virus from virus guard by masking them*
***Test virus:** these are virus written to test anti-virus software.*
***Time bomb:** this is a virus activated on predetermined days.e.g. idi,x-mas*
***Joke**: this is harmless program that does funny things. Your computer is about to explode please run away..!!*
***A bug:** is an error in a computer system which causes undesirable result*

***Ways Of Spreading Viruses On Networked Computers**:*
Through E-mails or distributed maliciously through the internet.
Through downloads from the internet especially free ones
Through freeware and shareware.

Ways Of Spreading Viruses On Standalone Computers:
Opening an infected file. Running an infected program.Starting up the computer with an infected floppy diskette.Use of infected storage devices like floppy diskettes, hard disk etc.

Symptoms of Viruses

- *Unfamiliar graphics or quizzical messages appearing on screens.*
- *Programs taking longer than usual to load.*
- *Disk accesses seeming excessive for simple tasks*
- *Unusual error messages occurring more frequently*
- *Less memory available than usual*
- *Access lights turning on for non referred devices.*
- *Programs and files disappearing mysteriously.*
- *Computer indicating that the storage devices are full..*

Disasters Caused By Virus

- *Damaging programs/software*
- *Deleting files/data on storage devices*
- *Formatting the hard disk.*
- *Boot failure*
- *Take up / fill up the computer memory*
- *Causes system crashes.*
- *Corruption of files*
- *Slows down the speed of the computer*

Precautions Taken Against Viruses (Control Measures)

- *Ensure that there are regulations and a policy on the usage of computers and their protection (e.g. no foreign diskettes unless first scanned)*
- *Ensure that the e-mails are from a trusted source before opening them or e-mail attachments*
- *Avoid opening e-mails before scanning them for viruses*
- *Install anti-virus utility and update its virus definitions frequently for detecting and removing viruses.*
- *Never start up a PC with a floppy diskette in the drive.*
- *Scan all the drives and files for possible virus infection before using them.*
- *Write protect the recovery disk before using it.*

- *Back up important files regularly.*

Anti-Virus Utility/ Program*An anti-virus utility is a program that prevents, detects and removes viruses from a computer's memory or storage devices. This utility is installed into the computer by the computer user or owner to perform the very purpose identified above. The user is required to check or clean the computer regularly using this anti-virus.*

Examples of common anti-virus programs include

A vast
-F-secure
-Raising anti vast
-Eset node 32
-Mac fee-
-Kaspersky
-AVG
-Avira
-McAfee virus guard
-Dr.Solomon antivirus
-SMADAV ,Comodo internet security
-Thunder byte
-panda -norton , Pc Tools threat

Gives three functions of an antivirus in relation to controlling viruses

→It cleans files/hardware e.g. flash discs that are infected
→It deletes files that are infected
→It blocks that installation of certain files whose software certificate is not trusted
→It scans and detects computer viruses
→It isolates files that are infected with a computer virus
→It notifies the user incase of expiry of the software that the user easily perform on update or renew the program

State any three ways computer virus are transmitted in a lab

- *Sharing of storage devices among various computer and users*
- *Downloading of files from the internet*
- *Sharing of files across a computer network*
- *Installation of software programs that are already infected*
- *Computer crime activities like hacking/cracking and software piracy*
- *Opening e-mail attachments that are already infected*

<u>TERMINOLOGIES</u>

- ✔ ***Computer security risk:*** *is the action that causes loss of or damage to computer system*
- ✔ ***Hardware theft:*** *is the act of stealing computer equipment*
- ✔ ***hardware vandalism*** *:is the act of defacing call it destroying computer equipment*

- ✔ ***software theft*** *is the act of stealing or illegally copying software or intentionally erasing program*
- ✔ ***Software piracy*** *is the illegal duplication or copyrighted software*
- ✔ ***Information privacy*** *is the right of individuals and companies to restrict collection and use of information about them.defficult to maintain today because data is stored online.*
- ✔ ***A worm*** *copies itself repeatedly and end up using up resources and possibly shutting down computer or network,*
- ✔ ***Trojan horse****: hides within or looks like legitimate program until triggered.*
- ✔ ***Spyware*** *is program placed on computer without user's knowledge, "secretly collects information about user"*
- ✔ ***A spam*** *is unsolicited e-mail message sent to many recipients*
- ✔ ***Content filtering*** *is theprocess of restricting access to certain material.*
- ✔ ***web filtering*** *is the software that restricts access to specified site*
- ✔ ***A username*** *is a unique combination of characters that identifies a user.*
- ✔ ***A password*** *is a private combination of characters associated with the user name that allows access to computer resources*
- ✔ ***Denial of service attack (dos).*** *Is the example of network attack where a hacker uses unsuspecting computer, called zombie**,** to execute attack on other system. And the victim computer network eventually jams which leads blocking of legimate visitors from accessing the network.*
- ✔ *A bug is an error in a computer system (software or hardware), which causes undesirable results or unwanted procedures..a bug error can be both software and hardware problem or a programming oversight.*

Effects of the computer bug (disadvantages)

- *May lead to the program crash of freeze leading to the disruption of service.*
- *Some bugs (errors) qualify as security bugs and therefore may enable a malicious user to bypass access controls in order to obtain unauthorized privileges.*
- *In computer controlled machines, a bug may bring system failure and result of the computer failing execute positive commands.*

Prevention of bugs

Bugs are a consequence of the human factors in the programming tasks. They are caused by oversights made by computer programmers during designing, coding and data entry.The software industry has put much effort into finding methods for preventing bugs in programming which include:-

1. Programming style*Innovations in programming style and defensive programming have been designed to make typing errors (bugs) less likely or easier to spot.*

2. Programming techniques*Programs can be written to check the inconsistency of their own internal data while running. If an inconsistency is encountered, the program can immediately halt so that the bug can be located and fixed. The program can also inform the user to attempt to correct the inconsistency and continue running. These programs that locate bugs are called debuggers*

3. Developing methodologies*Programming has been made more automatic than manual because of simplified programming languages so that fewer bugs can be produced through human error. .*

SYSTEM SECURITY AND ICT ETHICAL ISSUES System security *is the protection of computing systems and the data that they store or accessIt involves the various techniques for ensuring that data stored in a computer cannot be read or compromised by any individuals without authorized as well as protecting the physical computer that stores data from physical theft.*
This is the protection accorded to an automated information system in order to ensure integrity, availability and confidentiality of information system resources.

Forms Of Computer System Security
Physical security
This refers to measures put in place to guard against physical access to the computer systems.

Physical security methods /practices
Employ guards to keep watch over the data centers and their backups Burglar proof the computer room Reinforce weak points e.g. windows, doors and roofs with metallic grills and locks Installation of alarm systems Checking lab users

Data/ Logical security
This is a form of security which deals with protection of data from being accessed regardless of whether a system has been physically access or not.

Data Security Methods/ Practices Data Encryption:*This is where a document is put in a special code that can't easily be read until it has been decrypted.*
Activation code: *This is common with software that cannot complete installation until such code has been provided.*
Password: *This involves a use of a combination of characters that one must provide to have access to information or data.*
Biometrics: *This involves reading of the user's bio data e.g. iris, finger prints in order for the system to provide access to the stored information.*
Parental controls*: This involves giving different users different rights for discriminated access to data.*

Computer Security Threats
This is an act or event that can breach security and cause harm, pain, dangers or injury. Some are intentional and others are accidental.

They are two types of threats;
Hardware threat
Data/information threats
HARDWARE
-The act of stealing computer equipments
-Hardware vandalism is the act of destroying computer equipments
-Fire outbreak: in the computer
-Lightening
-Bombing (where there is political conflicts in some countries)

-Floods
-Temperature rise
-Power problem
-Theft: computer peripherals like mouse, keyboards, speakers can be stolen
-Tornados': this is where a rotating column of air which also carries dust and earth objects move at a very high speed and can destroy buildings and computer devices

MEASURES
-Employ guards to keep watching over data and information
-Apply burglar proof
-Reinforce weaker access point (doors, windows)
-Do not leave hardware in an open area
-Use cables to lock the equipments
-Install lightening conductors
-Use un interruptible power supply
-Attach alarms and buzzers that will alert you when there is an external force
-The lab should be raised up to avoid floods
-Have a first aid box in the lab
-Install cameras

DATA /INFORMATION*:*
These are the threats that are most likely to attack our data and software .

The basic data security standards which data management technology must ensure includes

> ***Confidentiality****:. it allows individuals to see only the data which they are supposed to see*
> ***Integrity:*** *here data is protected from deletion and corruption both while it resides within the database (computer) and while it is being transmitted over the network*
> ***Availability:*** *this is to secure systems that make data to be available to authorized users without delay.*

And are some of the Data/information threats

→*Computer viruses*
→*Phishing*
→*Cracking*
→*Hacking*
→*Eaves dropping*
→*Sabotage*
→*Surveillance*
→*Fraud -Accidental deletion*

-Malicious software: programs designed to destroy our files
-Data alteration usually made by employees: some employees in an organization may change some data code and cause losses to the organization.(.e.g. a school bursar may write 10000= instead of 100,000=)
-Errors and omissions (skip some part of data accidentally

-Computer crimes: this is the use of a computer or a network to commit a crime for example denial of service attacks, cyber stalking etc
-When someone accesses a computer illegally, he /she may delete your data intentionally (and is called malicious hacker hence cracker)

MEASURES
-Pass wards your files
-Limit number of passwords login
-Always save your work before you go and learn how to save
-Make a backup before you make some changes on critical data
-Perform regular maintenance
-Protect your passwords (not be share by many people)
-Never open an email attachment anyhow.
- Always run it and down load it through a virus scanner first
-Protect your network by fire walls(firewall can be a device or software that can be used to keep the network secure from illegal access. It analyses data packet and controls the incoming and outgoing packets)
-Burn all old storage devices
-Install antivirus
-Inspects and spy your data employees to reduce on errors
-Provide enough training to your staff on how to use computer and handling files
-Improve on data laws or copyrights
-Be care full when sending electronic messages to avoid internet pirates
-Ensure data integrity by checking it before keeping or sending it and see whether its not corrupted(those are errors in a computer data that occurs during transmission or retrieval hence introducing un intended changes to original data)
-Use file and disk encryption:

***NB.ACCESS CONTROL**: Is the security measure that defines who can access a computer, when the user can accesses a computer and what actions the users can take while accessing the computer*

Control is normally implemented using two phase
(a) ***Identifications*** *verify whether the user is a valid one.*
(b) ***Authentication*** *verifies that the user is really the one he or she claims to be.*

Methods of identification and authentication exist and they include

- ✔ *User names and passwords*
- ✔ *Possessed objects*
- ✔ *Biometric devices*
- ✔ *Callback system*
- ✔ *Personal id no.(PIN)*

Passwords**'; Combination of characters associated with a user name that allow a user to access a computer or network* ***Tips for safeguarding your password

- Do not share your password with others.

- Do not write your password down.

- Change your password frequently.

- At leastuse 8 characters if supported by the system.

- A combination of mixed case letters and digits.

–Use A password that can be typed easily without looking at the keyboard.

-Do not Use your name, birth day, ID card number or telephone number

***Possessed objects**: is any item that a user must carry to gain Access to a computer or computer facility (include; badges, cards, keys)**Call back system** connects a user to a computer only after the computer calls the user back at a previously established telephone number: to initiate the call back system, the user calls the computer and then enters the correct username and passwords .the computer instructs the user to hang up and then calls the user back.*

***A personal Identification number (PIN)** is a numeric password, either assigned by a company or selected by a user. PINs provide an additional level of security.*

*(c) **Biometric devices**. A biometric device authenticates a person's identity by verifying personal characteristics e.g finger prints. It translates a personal characteristic into a digital code that is compared with a digital code stored in the computer. Examples of biometric devices include.*

*- **A finger print scanner**, which captures curves and indentations of a finger print.*

*- **A hand geometry system**, which can measure the shape and size of a person's hand.*

*- **A face recognition system**, which captures a live face image and compares it with a stored image.*

*- **A voice recognition system**, which compares a person's live speech with the stored voice pattern.*

*- **A signature verification system**, which recognizes the shape of a handwritten signature of a person.*

*- **An iris recognition system**, which reads patterns in the tiny blood vessels in back of the eye, which are as unique as a finger print.*

***Advantages of Biometric devices** - Personal characteristics are unique and cannot be forgotten or misplaced.*

***Disadvantages of Biometric devices**- Most of the biometric devices are expensive. - A finger print scanner might reject a legitimate user if the user cuts his or her finger. - Hand geometry readers can transmit germs. - A signature might not match the one on a file when the person is nervous. - A voice recognition system might reject a legitimate user with a sore threat.*

*(d) **Call back system**. A call back system connects the user to a computer only after the computer calls the user back at a previously established telephone number. To initiate a callback system; - The user calls the computer and then enters the correct user name and password. - The computer instructs the user to hang up and then calls the user back.*

***COMPUTER CRIMES** These are offences committed using computers. They include the following:*

***Trespass:** this is an illegal physical entry to restricted computer places.*

*→illegal access to data sent over a network**Hacking:** this is an illegal access to computer held data and information.* *→The act of breaking into a computer system to gain unauthorized access.* ***Tapping**: The use of*

*intelligent program (spyware) to gain unauthorized access to information and data during transmission.**Cracking:** this is unauthorized access to information through breaking security systems.*
***Fraud:** This refers to the use of computer to cheat other people.*
*→The use of computer system to create fake documents, hide information or cheat unsuspecting public with intention of monetary benefits**Sabotage:** This is the illegal destruction of data and information to cripple service or cause great loss to the organization.*
***Alteration:** This refers to unauthorized changing of one's data and information.*
***Eaves dropping:** this is tapping into a communication channel and listening to the communication that is not meant for you.*
*→This is the act of secretly listening to the private conversation of others without their consen**Masquerading:** this is tricking people into revealing information by criminals pretending as the rightful sender or receiver.*
***Spoofing:** A method of attacking a computer program and using it to gain illegal access despite the program continuing to behave normally.**Phishing:** Is an act of tricking people into giving secret information through E-mail. →The act of attempting to acquire sensitive information like passward,user name credit card details by disguising/pretending as a trust worth source**Vishing:** Is an act of tricking people into giving secret information through phone calls or voice over IP **Piracy:** This is making illegal copies of copyrighted information for commercial gain.*
***Cyber stalking**: use of a computer to harass others*
*→The use of ICT mainly the internet to torture other individual through false accusation.**Pin of death**: pinging means sending a message using a computer on the network to another computer to check if the computer is well connected and will be able to communicate with other computer. But the ping of death is a network attack whereby instead of sending a good message, someone sends a malicious message. A pin is usually 32 bytes and sometimes 64bytes packets, so sending more than that can destroy the computer system or the receiver!!!*
***Computer fraud**: it involves use of a computer to conceal information or cheat other people with the intention of gaining money or information.*
***Denial of service attack: an** attempt to make a machine or network resources unavailable to its intetended user. **Data erasure**: method of software based overwriting that completely destroy all electronic data residing on digital media*
Measures of guard illegal activities of hackers
→Use of data encryption mechanisms-non-red able format
→Using fire walls at the network gateways
→Use of burglar proof doors and security lock devices
→Use of security mechanisms such as sensors and CCTV,alarms and buzzer against intrusion →Ensuring password usage by authenticate users of data system
Backup as used in computer security
Making of copies of data so that additional copies may be used to restore the original after a data loss event→In case of natural disasters such as fire outbreaks, earth quakes

→*In the event of hackers or cracking of original data*
→*In case of data loss due to virus infection*
→*In case of hard disk crash*

ICT / COMPUTER ETHICS:*Are moral standards that help guide behaviors, actions and choices*
Ethical issues in ict.*Are the moral standards or principles that govern the use of ICT*
Ethical may differ from legal in some areas!.Some practices are legal but not ethical. Take an example someone marrying a fellow man. This is legal in some countries but not ethical.
Computer ethics: *these are moral guideline that governs the use of computers and information systems*

Sample IT Codes Of Conduct(ethical practice) →*Computers may not be used to harm other people.*
→*Users may not interfere with others" computer work.*
→*Users may not meddle in others computer files.*
→*Computers may not be used to steal.*
→*Computers may not be used to bear false witness.*
→*Users may not copy or use software illegally.*
→*Users may not use others "computers resources without authorization.*
→*Users may not use others output.*
→*Users should always use computers in a way that demonstrates consideration and respect for other people.*

Terms Associated With Ethics
Data accuracy: *This is where data is free from errors.*
Data Confidentiality: *This is where data is disclosed to only authorize people.*
Data Integrity: *This is where data is protected against unauthorized modification.*
Availability: *This is where data is availed to the rightful users without delay or denial.*

The major ethical issues can be summarized below as (PAPA)
P*-Privacy*
A*-Accuracy*
P*-Property*
A*-Accessibility*

1. Privacy
This is the right of people not reveal information about them. It is closely related to data security and occurs when Un authorized access tries to attack a system. It involves making illegal copies of copyrighted software, information or data for commercial gain
i).Software piracy- *The un authorized use or distribution of software*

Means To Guard Against Privacy:
→*Enact laws that protect owners of data and information against piracy.*
→*Make software cheap enough to increase affordability*
→*Use licenses and certificates to identify originals*
→*Set installation passwords that deter illegal installation of software*

ii).Information privacy *is the right of individuals and companies to restrict collection and use of information about themThis is the right of individuals and organizations to collect, use and disclose own information. Examples of information an individual or organization may keep private*

- *Credit records*
- *Personal habits*
- *Health history*
- *Business secrets*
- *Political opinions*
- *Business associates*
- *Trade union membership*
- *Government Data*
- *Financial information*

*.(difficult to maintain today because data is stored online)****Popularly known as cloud computing***

Violations Of Privacy

Intrusion: *This is an invasion by wrongful entry or possession of one's property.*
Misuse of information: *This is when someone gives out information wrongfully for unknown purpose.*
Interception of information: *This is unauthorized access to private information via eavesdropping.*
Information marching: *This is linking individual records in different databases.* ***High-tech*** *surveillance of employees.* ***Employee*** *electronic monitoring e.g. use of CCTV.*
Email *monitoring.*
Internet *activity monitoring*

2.Accuracy*: this involves in determining on who is responsible for the accuracy of information (authenticity/fidelity),* ***OR***
Who is accountable for mistakes and errors in information and how is the aggrieved or injured party can be made whole

3. Property*:*
This involves determining who owns information. What are the just and fair prices for its exchange or who owns the channels of information especially airways and through which information is transmitted

4. Accessibility*: this involves knowing what information a person or an organization has a right or a privilege to obtain and under what conditions and with what safeguards*

INTELLECTUAL PROPERTY*:*
This means that a company or person owns the rights to some kind of technology innovation.
Examples Of Intellectual Property
1) Music, 3) Articles 2) Books 4) File 5) Software 6) Trade secrets 7) Art pieces 8) Videos
Intellectual Property Rights
These are legally recognized rights to creation of mind or ideas
→These are privileges accorded to creation of mind and knowledge.
→They involve protection against unauthorized duplication and usage.
→Intellectual property is Intangible property created by individuals or corporations that are subject to protections.

Property Rights Protection
Patent rights*: This is a legal document that grants the owner an exclusive monopoly on the ideas behind an invention.*

→legal instrument (intellectual property law) declaring that a computer or a person has ownership over an idea/technology
Trademarks: *It is a mark that distinguishes a service or a product in the minds of the consumers from other products.*
→Recognizable sign, design or expression which identifies productions or service of a particular source from those of other
Activation code: *This is a password given to only the rightful owner of a service or software protecting it against unauthorized access and use.*
Copyright: *The legal right granted to an author, composer,playwright,publisher, or distributor to exclusive publication,production,sale or distribution of a literary, musical,dramtic, or artistic work.(**Abbreviated as "© or (c)***
Copyright is the exclusive legal that prohibits copying of one's (the author or creator) original property without his/her permission
Copyright infringement*: copying of intellectual property without written permission from the copyright holder*

Need for the copyright law in the modern computer era
>protection of consumers against fake computer products
>Granting of ownership
>prohibiting of unfair profiting from other people's work/efforts
>encouragement of creativity by ensuring that creative people receive the financial benefits of their work
>ensuring good international relations and image. A country without copyright protection is viewed as one which encourage stealing
>ensuring quality products as producer try to guard their copyrights jealously
>to allow payments of damages to the copyright owner

THE FUTURE OF COMPUTERS AND THE INTERNET
Some technological advancements and trends are recognizable and can be predicted. It is easy to predict that the computers and related equipment will get faster in memory, smaller and cheaper. Computer technology will find new application and manufacturers will strive to make computing easier and cheaper. As costs decline and performance and ease of use rises, LAN"s play a bigger role in corporate information systems. Possible future trends in computer capabilities, physical size, price and software.

(a) ***Future computer capabilities****.Theyare going to have more powerful, smaller processor and faster access to memory.*
Will have operating systems that will handle real time data analysis and object oriented.Will have improved user interfaces that offer users easier and more intuitive access to information.Will have multi-media applications that will be fully incorporated into some information systems because data is easy to interpret when presented as a combination of sight, sound and motion.
(b) ***Physical size****. Most hardware components will get smaller and faster. This means computers will become smaller and do more.*
(c) ***Price****. As technology advances, the price of computers will go down.*
(d) ***Software.*** *Software development will also develop to allow users easily operate computer systems.*
(e) ***Artificial intelligence****. Artificial intelligence is the process of building computer systems that simulate human thought processes and actions. The goal of artificial intelligence is not to replace human intelligence which is not replaceable; rather it is to help people to become more productive. Artificial*

intelligence attempts to develop computer systems that can mimic or simulate human thought processes and actions. They include expert systems, natural language processing, artificial neural network and robots.
***Expert systems**. Expert systems are computer programs that essentially emulate the knowledge of human experts skilled in a particular field for example of a geologist or a medical doctor.*

***ICT EMERGING TECHNOLOGIES**Technology has and is advancing at a very high speed. Every year we at least get some new technology in place and this happens in almost all sectors for example in agricuriture, information, industry, military and others**.**ThisTechnology is indentifying the top most promising technology trend that can help to deliver sustainable in decades to come as global population and material demands on the environment to grow rapidly.*

APPLICATION AREAS OF EMERGING TECHNOLOGIES
Education e.g. in Computer Aided Learning (CAL).Telecommunication.Health e.g. telemedicine, surgery.Business e.g. online business, document processing, accounting and finance.Research e.g. exploratory research on mars and space.Science and engineering.Military and government.Agriculture.Entertainment and leisure.Manufacturing industry.

EXAMPLES OF EMERGING TECHNOLOGIES
-Cloud computing
-4G cellular communication (mobile internet)
-Online electric vehicles
-Three-dimensional printing and remote manufacturing
-Remote sensing
-Precise drug delivery through nanoscale engineering
-Machines replacing humans (robotic)
-Humans and machines working alongside each other
***3D Printing/ additive manufacturing**: This is enables the printing of real objects like cups which an individual can use for drinking. It started in 2013 and is rapidly growing. **Robotics** :This deals with the design of automated machines which take the place of humans in dangerous environments.*
***4G cellular communication :**This involves use of smart phones with many applications (apps) which have improved communication and information processing.*

***Artificial intelligence**-AI-is the programming of a computer to have all the human senses. Such as Self hearing material, voice recognition, use of spy cameras, Devices like robots that can make decisions on their owns because of interagency put in them*
***Virtual reality** (programmed dream)-these are computer programs that can take you in an imaginary world and feel your presence when in reality you are still in real world*
***Machine vision** –robots are guided to detect bombs in rooms by use of machine vision methods*
***Machine translation** –this is a new technology that encourages use of software and hardware to translate a speech or text into someone's mother language*
***Artificial intelligence.**Simulation or creating of intelligence similar to human .e.g.*
***Robotic**-computer controlled device that mimics a human being in carrying out routine tasksNatural language processing*
***Simulation.**Is a science of representing behavior of real life situations using a computerized model*
***Virtual reality.**A condition in which a person becomes psychologically submerged in an artificial setting*

generated by a computer system

Examples of virtual reality

In computer aided learning
Computer games
3D movies
Online advertisement
Online tourism
Interactive mapping (Google maps)

Areas where GPS is currently being used in business

→*To allocate a person or an object in business*
→*Create a map*
→*Monitor the movement of a person or objects*
→*Many cars and ships also use it to provide directions to a destination and weather information*

Advantages of Using Mobile Phones

→*You can carry a mobile phone with you so you don't miss important call*
→*If you are lost, you can call for directions*
→*If you are in an accident, you can call the police or ambulance – and if the phone has a camera you can take pictures of accident.*
→*You can listen to music, text, and play games when you're bored.*
→*Most mobile phones have a calculator and a phone book.*
→*You can use a mobile phone to call your customers or boss if you running late to a meeting*
→*You can surf internet & connect with the whole world by mobile.*
→*You can chat on face book; twitter etc. and video conference*
→*Keep in touch with friends and family*
→*Good for emergencies*
→*Employees can keep in touch at all times*
→*Customers can contact staff 24/7*
→*You can check your email*
→*It can fit in your pocket*

Disadvantages of using mobile phone

→*Mobile phones can be expensive*
→*They can damage your ear*
→*Sometimes the reception is poor in some areas, limiting your connectivity (you can't talk under group or on planes)*
→*People use the phone while they are driving, and this can cause problems*
→*They can limit your face to face time with friends and family*
→*Can be hard for older people to use*
→*Staff can abuse their phones if they have internet connection*
→*Because of their smaller size, they can be easy to lose.*
→*Some page can be heavy and large to be displayed on some phone screens*
→*Some web files may not be compactable on some phone screens/windows*
→*They are prone to virus and hard to format due to manufactures password*

What are Social networking sites or service?
→ Websites visited for leisure/chatting, in a real time communication (instantly)

b).Identify at least 4 examples of social networking sites*.*

→ Face book
→ Twitter
→ Whatsapp → E-bay
→ E-mails
→ Vibers → Palm chat
→ Palm play
→ You-tube
→ Histogram

ADDITIONAL INFORMATION

A Brower *To remove dust accumulation from hardware components and system units WHILE* ***–a fun*** *Modify the condition of air in the lab such as cooling*

A surge protector: *only protects a computer from high voltage while* ***UPS*** *protects the computer from sudden power loss/temporary power loss unit for the computer in case of power blackout*

CCTV camera.*Help you inspect the place to avoid people that many need to move out with some gadgets WHILE* ***Web cam*** *– A video camera whose output displays on the web page. Used for video calls*
Trouble shooting.*The process of identifying and fixing a computer problem. WHILE* ***ergonomic****s is to minimize injury and discomfort while using a computer*

Green computing.*The use of computer in line with environmental conservation WHILE* ***Cloud****Is the technology that allow you to keep our files on a remote server and we can access those files any time, any where*

Microprocessor.*This is an integrated circuit (chip) that does the entire full scale computing WHILE* ***A wordprocessor*** *is application software that is used to create, save, edit, format and print documents that contain text and graphics.*

Enter key

Pressing it will take you to a new line,
Word wrap*. Word automatically starts anew line when you reach the end of the current line and*
Wrapping a text *means making a text fit in a cell when you're dealing with spreadsheet*

→***Clip art****.inbult images in word processor library*
→***Clipboard.***
Temporary files used to store information

Page layout*: Toolbar where you can set page size like orientation, column, margins* ***WHILElayout*** *it's where you can label your axes in excel and change a certain slide face in PowerPoint*

Foot notes -*A feature that helps you adds extra information on what you have written in your document it is put at the end of page.****While Footer*** *→Is text that is separated from the main body of text and appears at the bottom of a printed page margin?*

→ ***Thesaurus****-A feature that helps you find the meaning and other words that can be used instead of the one you want to use.* ***Spelling checker*** *Allow a user to check and correct the spelling of a whole document at one line.*

The system unit (system case).*This is a box like computer device that contains the internal components of a computer.* ***Microprocessor/CPU****/Processer*
→A hardware component where all operations of the Computers take place

Multiprocessing and Multiprogramming as used in data processing
Multiprocessing*: The execution of more than one program by the same processor*
Multiprogramming*: The processing of two or more programs by the same processor at the same time*

Buffers*. This is a region of memory that is used to hold data temporary while it is being moved from place to place.****Cache memory****. - Faster memory which help to speed up computer processes by storing frequently used instructions and data*

Parallel port: *connects devices that can transfer more than one bit at a time, such as a printer*
A serial port: *transmits one bit of data at a time. Connects slow-speed devices, such as mouse, keyboard, modem*

Address bus and a data bus.
An address bus consists of all the signals necessary to define any of the possible memory address locations within the central processing unit, ***while*** *A Data Bus (memory bus) is used to transfer instructions from memory to the CPU for execution.*

Reading data from the memory and writing data on the memory as used in CPUReading: *the process of transferring data, instructions and information from a storage medium into memory.* ***Writing****: the process of transferring items from memory to storage medium*

Machine:*These are series of operation needed to execute a single instruction:****Information.*** *The act of changing/converting data into more meaning format /information*

System update. *Provides bug fixes and minor software improvement*
Software update *Is a purchase of a newer version of software you currently use of a more fully-featured version of your current software.*

Single user license. *A license agreement that gives a software buyer the right to use [install] software on a single computer at a time:* ***Site license.****-Gives a software buyer the right use/install the software on multiple computers at a single site*

Firmware *Also as stored logic is a combination of both the software and hardware recorded permanently on electronic chips.{usually Read- Only-Memory chip that is planted into the motherboard}.* ***Freeware****. Is software provided at no cost to users?*

*d).****Graphical user interface (GUI) operating systems***
A type of user interface that allows users to interact with programs by manipulating graphics, along with a keyboard and pointing devices such as a mouse, to provide an easy-to-use interface to a program. GUI allows one to enter commands by pointing and clicking at pictures (icons) that appear on the screen. It allows the use of a mouse to click at icons or graphics on the screen. ***Command-driven*** *Operating Systems lets the user type a command at a command prompt. The commands are executed after pressing the Enter key or the Return carriage.*

Formulae *Is a mathematical expression used to solve mathematical problem .must begin with equal sign (=).****Functions.*** *These are inbuilt predefined formulae that the user can quickly use instead of having*

Worksheet: *- Is a grid of columns and rows. It is a component in which data values are entered. OR A single work space in a spreadsheet.* ***Workbook:*** *This is a collection of worksheets grouped together. OR Collection of work sheet*

Relative referencing: *A cell address that changes as the formula gets pasted to other cells****Absolute referencing:*** *A cell address that does not change as the formula gets pasted to other cells. A formula where a cell reference remains fixed when copied.*

Labels. *Any text or alphanumeric character entered in a cell*
Values. *Numbers which can be calculated mathematically*
Row*: is the horizontal arrangement labeled 1, 2, 3…*
A column*: is a vertical arrangement of cells labeled A, B, C…*
A cell*: an intersection between row and a column*

Data Validation: *This is the checking of input data for errors before processing.*
Data Normalization: *This means minimizing any data duplication as far as possible*

A Flat file database *is made up of one table.* ***A Relational database*** *can take information from two or more database tables and combine them into a new table or report.*

Primary key: *A field or combination of fields that uniquely identifies each record in the table. Used to uniquely identify a record in a table.****Foreign Key:*** *A copy of the primary key in another table. Field that related to the primary key of another table.Used in one table to represent the value of a primary key in a related table.****Composite key:*** *This is a primary key that is comprised of two or more fields. It can also be called a compound.*

Terminal. *Is a device with a monitor and a keyboard?* ***Dumb terminal****: this has no processing power, cannot act as a standalone computer and be connected to a server to operate*

Master slide*Is a special slide that once designed acts as a template for the rest of the slides in the show? Its features can be applied or used in all other slides.* ***Web master****: this is a person who creates, maintains and manages a website often for a business organization*

Animation. *Visual effects applied to individual items in a slide (images, titles or bulleted points)****.***
[*Putting monitor and or sound to various objects in your slides]*
Transition*: this is the visual movement in a given slide show. It is a method of moving one slide off the screen and bringing on another onto the screen during a slide show. Move/switch from one slide to another.*

Track Ball Mouse (common on laptop computers).
A rolling ball and buttons embedded within the keyboard. Just a small head protruding through the keys on the keyboard is the one which is used to move the mouse pointer by passing a finger over it.
Touch pad mouse (Laptops).*This has a rectangular pad with 2 push buttons. The movement of a finger*

on the pad causes the mouse pointer to change positions accordingly.

The Optical mouse*-This employs the principle of laser beam of light to transmit signals to the CPU.* ***Optical****-This uses devices that emit and sense light to detect movement of the mouse****The cordless Mouse -****This is a recent invention in the mouse technology. It does not have a cord (cable) attached to the system unit. The computer senses the mouse when it is within reach because of the program installed in it.* ***Cordless (either mechanical or optical)****-This transmits data using wireless technology such as radio waves or infrared light waves*

*→****Ant viruses.*** *Scan the computer to ensure proper functionality.*
*→****Anti-virus:*** *This detects and removes viruses from the computer.*

Hacking*: Illegal access of one's information.*
Cracking*: Breaking of one's security system to access his information.*

Computer crime *Any criminal activities which involve the use of* ***ICT*** *to gain illegal or unauthorized access to access a computer system with intent of damaging, deleting or altering computer data*
Cyber Crime:*-Any crime committed on a computer or committed using computers (unlawful use of a computer set)*
A computer bug *is an error in a computer system which causes undesirable results or unwanted procedures.* ***Computer error*** *can be both software and hardware problem or a programming oversight.* ***Virus*** *computer program designed to infect and affect the computer's performance negatively.* ***A worm is example of a virus*** *that sticks in a computer memory and replicate to fill it*

RAM*. Working space of the computer that temporarily holds all open Programs .****Registers*** *are high-speed temporary storage locations within the CPU used to hold data and instructions.* ***NB****. (RAM is hardware while register is space/software)*

Primary storage *is the working space of the computer that temporarily holds all open Programs(volatile)e.g. RAM & ROM.* ***Secondary storage*** *offers permanent storage of one's information for Future reference.(backup or non-volatile)*

*.****Hard disk*** *Permanent storage device,* ***A DRIVE:*** *Device that reads from and writes to disc. A drive is a slot or an opening where a storage device or disk is inserted*
Disk drive *is an opening/carbine where a hard disk can be red or written to-*
e).Example of optical non-volatile CD. While drive an opening for reading CD

Formatting a text *means changing the text appearance.* ***Formatting a Storage*** *means preparing the storage to look new and ready for storage*

Web browser. Browsing*: means searching for particular or specific item on a Web*
→A software program that fetches web pages from another computer and displays them to the user
.→Software program that allows you access and view WebPages.
→Is an application program that can be used to view or load web pages
Search engine. *→is a tool/program that allows a person to find specific documents by use of key word www.e.g.google,yahoo, Ask, Excite*

Programming language.*Are the artificial languages designed to communicate instructions to machine, particularly a computer. →The means of communicating with the processor.(Computer*
Language processor*: Programs used to translate HHL into LLL and back into HHL c).Software and system software*

*→**Disk cleaner**.Can find files that are unnecessary to computer operation or take up considerable amount of space.*
*→**A disk checker**: can scan the contents of a hard disk to find files on areas that are corrupted in some way, or were not correctly saved and eliminate them for a more efficiently operating.*

Systems administrator: *The person, who designs, sets up and maintains a computer network.*
Database administrator: *Creates tests and maintains a database. Updates records in an information systems*

An e-mail address.*Unique name that consists of a user name and domain name that identifies the user.*
Electronic Mail: *is the transmission of message via a computer network or internet*

Internet: *Is a worldwide collection of networks linked together* ***Network****:The collection of computers and other hardware devices linked together for the purpose communication and sharing resources.*
World Wide Web-*Also called the web consists of a worldwide collection of electronic doc.each of these doc on the web is called a web page*

A web site*: is a collection of related web pages.* ***A web page:*** *pages that contain text, graphics, audio and video and hyperlink to other document or simplify a document on internet.*

Intranet *is a network within the company and can be accessed within the company while* ***extranet*** *can be accessed even those outside company*

Client. *This is a computer that is requesting for some information e.g. A web page from another Pknown as host.*

.Gateway: *allows two networks of different configurations to communicate with one another.*
Bridge. *It is a device used to establish a connection/communication between different networks*

Modulator&demodulator*.So a device that is capable of converting analog signals into digital signals (****modulating****) and can also convert digital signals into analog signals (****demodulating***

(LAN) *Local area net workphysically connected and****(WLAN)****wireless local area network wirelessly connected (Bluetooth,wi-fi)*

WIKI-*A site which users collaboratively edit its content* ***e.g****. Wikipedia*
WI-FI (Wireless Fidelity)*. Is a popular technology that allows an electronic device to exchange data wirelessly (Using radio waves) over a computer network?*

Extra Ordinary Efforts Bring, Extra Ordinary Results.