

Unit 3. Databases

Introduction, Definition of terms and functions of Database Management system

Management of data is important in all organisations. Data in organisations forms part of the strategic, tactical, operational management and decision making process. Electronic databases have changed the way data is created, managed and stored using computerised information systems.

Definition of terms

Database - It is a collection interrelated data files stored in an organised manner to permit easy retrieval.

Database management system - Software that manages storage, processing and retrieval of data in a computer.

Examples of database management system software include: FoxPro, Dbase III+, Dbase IV, MYSQL, Lotus Approach, Microsoft Access, Microsoft SQL server and Oracle.

Filing management systems - Computerised filing method that uses non-integrated files called **flat files**.

Functions of a database management software

- i) Interfaces a database to other application programs.
- ii) Safeguards database against unauthorized access.
- iii) Allows statistical analysis of data.
- iv) Permits the addition of new records.
- v) Allows modification of existing records.
- vi) Organises data for easy access, retrieval and manipulation of records.

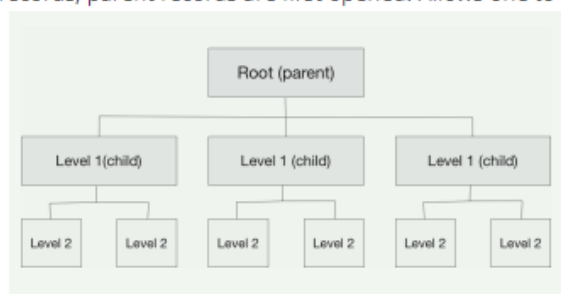
Types of database models

a) **Flat File** Holds only one set of data and it is not any different from manual files. Do not allow relationships to be created amongst files.

Name	Thompson Lucas
Patient ID	NRB/345/2018
Date of admission	22/7/2014
Block admitted	C
Bed number	HOSP/BLOCK C/004

b) Hierarchical Model

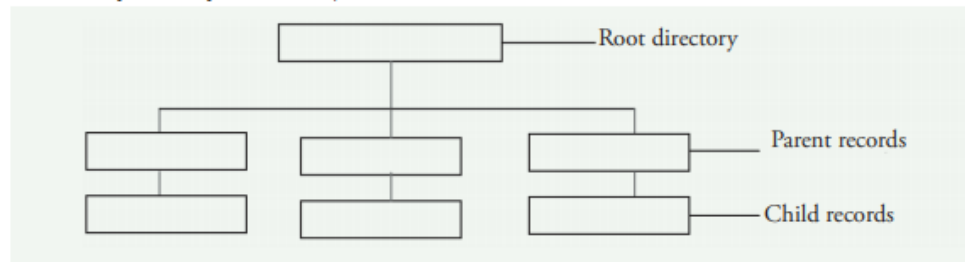
Records are arranged in a form that resembles family tree with lower level records subordinating to the upper level records as shown in Figure below. The top most record is called Root directory. To access lower level records, parent records are first opened. Allows one to many relationships.



c) Network model

Resembles hierarchical but has been modified to allow flexible access to records. A child record can belong to several parent records.

Allows many to many relationships.



Network database model

d) Relational database model

Data is organised in tables also called relations. Records are uniquely identified using a key field (primary key). Permits several types of relationships including one-to-one, one-to-many and many-to-many relationships. Relationships are created amongst tables by linking a primary key to a foreign key. Rows hold records (also called tuples) while columns hold fields (also called attributes).

Admission table		Primary key
→ Patient ID	NRB/345/2018	
Patient name	Thompson Lucas	
Date of admission	22/7/2014	
Block admitted	C	
Bed number	HOSP/BLOCK C/004	
Payment table		Foreign key
→ Patient ID	NRB/345/2018	
Amount of bill	22/7/2014	
Date paid	C	
Balance	HOSP/BLOCK C/004	

Object oriented models

Designed as a collection of objects. An object consists of both data (state) and the instructions (behaviour) to process the data. The process of combining state and behaviour in one object is called **encapsulation**. Allows databases to hold multimedia data.

Difference between Filing Management and Database Management Systems

Filing Management Systems	Database Management Systems (DBMS)
Use files that are not integrated.	Use integrated files
Low data integrity	Use integrated files
Allows slower data modification	Allows faster data modification
Not compatible with other applications	Compatible with other applications

Features of a database management software

DBMS have the following features:

Table – A data structure that is used to accept and organise records.

Form – A graphical interface used to enter data onto an underlying table.

Query – A tool used to extract and analyse data.

Report generator – Used to create and present both soft and hardcopy summaries of a database.

Macro – Used to automate frequently executed commands so that they can be executed together.

Programming module – Used to add new instructions in a database

Data organisation in a database

Data is organised from the smallest unit called a **field** to the largest unit called a **database** as explained below:

Fields

It consists of a character or set of characters that give some piece of information about an entity.

Records

It is a set of related fields that give sensible information about an entity, for example, a patient's row in a table showing patient's name, patient's number, admission date, diagnosis and prescription.

Tables

It is a set of related records, for instance, a file showing all the patients admitted in a specific ward.

Databases

It is a set of interrelated files. For example, all patients, doctors and stock inventory files in a hospital.

Field data types

Text

It includes alphabetic letters, numbers and punctuations and can support up to 255 characters. Used when a field will not be mathematically manipulated.

Memo

It consists of letters, numbers and special characters. It supports up to a maximum of 32,000 characters.

Number

It consists of numeric numbers 0 to 9. The field can be mathematically manipulated.

Date or Time

It identifies a field as either date or time. It can be mathematically manipulated.

Currency

It identifies numeric values that have decimals parts like monetary values.

Auto number

It automatically sets the first entry to one and subsequently automatically increments the values in the field by one.

YES or NO

It allows logical values with two truth values like true or false to be entered.

OLE Object

OLE stands for Object Linking and Embedding. It is used with graphical user interface applications to insert images, pictures, drawing and charts among others

Field properties

Define finer details of fields. They include:

- **Field size** It allows the user to set the number of characters a field will consist of other than the default 50. For numeric fields, the following sizes are used:

- **Integer and long integer**

Accept fields with no decimals.

- **Byte Accept** numbers between 0 and 255.

- **Single and double** Accept number with decimals.

Single supports up to 38 decimal places while double up to 308 decimal places.

Format

Dictates how data appears on the screen when typed.

Decimal places It allows the user to specify the number of decimal places.

Input mask It automatically formats the field entry into a specified manner.

Caption It gives a more descriptive name for the field in a table or a form.

Default value

It is a value that automatically appears in the table or form if no other entry is made.

Validation rule

Logical expression that controls the values entered in a table field.

Validation text

A message that appears once the validation rule is not observed.

Required

It ensures that an entry is made in a field before proceeding to the next field or record.

Allow zero length

It allows the user to proceed without making an entry in the field.

Indexed

It is used to organise records for easy searching. **Note: Primary key** is a special index used to speed up searching and sorting records in a table. It uniquely identifies each record stored in a table so that no record duplication is made.

Table Design Terms

Entity – A person, thing or a place about which data can be stored.

Attribute – Data that can be used to describe an entity.

Foreign key – A primary key transferred to another table to help create relationships.

Referential integrity – A feature that ensures that all records entered in the related table exist in the primary table.

Normalisation – Process of removing repeating fields among relating tables. A table is created by specifying:

- Field names
- Field data types
- Field properties
- Primary key
- Table name A table can be linked to other existing table(s) in one of the following ways:
 - One-to-one relationship – A field in a table matches only one record in the relating table.
 - One-to-many relationship – A field in a table matches several records in another table.
 - Many-to-many relationship – Specific records in a table match several records in another table.

Form design

A form is a graphical interface that enables the user to easily view and make data entries into an underlying table or query.

Terms:

- **Controls** – Are objects placed on a form to show data or execute some commands. Examples include: text box, check box and command buttons among others.
- **Bound control** – Data is sourced from a table or query.
- **Unbound control** – Data is typed directly. Does not source data from table or query.

The following form layouts exist:

- Columnar
- Tabular
- Datasheet
- Justified

Query design

The term query refers to a question used to instruct a database to retrieve data or perform operations such as insertion, update and deletion of data in a table. Used to analyse table(s) data using either of the following types of query:

- Select query It allows the user to specify the search criteria.
- Action query They are used to makes changes to records such as delete, update and add a group of records from one table to another or create a new table from another table.

Four types of action Query

- Make table query- Creates a new table from an existing table.
- Delete query- Erases specified records from a table(s).
- Update - Modifies data in a table.
- Append query- Adds data in a table from a table(s).

Calculations in a query

Calculations in a query can be performed by using the Total functions (Σ) or by creating basic formulae. A few formulae are described below:

- Min - Returns the lowest value from a field column.
- Max - Returns the highest value from a field column.
- Count - Returns the number of items in field column.
- Sum – Adds numerical data items.
- Avg - Computes the mean of numeric data items.

Specifying the search criteria

Conditional statement(s) are used in the criteria row to extract specific records. Operators and wild cards are used in specifying the criteria records.

i) Relational operators which include:

- less than(<)
- greater than(>)
- greater than or equal to(>=)
- less than or equal to(<=)
- not equal to (< >)
- equal to (=)

ii) Logical operators which include:

- AND
- OR
- NOT
- BETWEEN

iii) **Wild cards** – are special characters used to substitute other characters at their position in search or querying process. They include:

- ? – substitutes a single character at its position (Example: ?om can extract Tom, Yom, Com)
- * - substitutes group of characters at its position(Example: P* can extract Paul, Poem)
- # - substitutes any single number (Example: 2#5 will match 205, 215,225, 235)
- [] – substitutes any single character within the brackets (Example: P[AE]L matches PAL, PEL)
- ! – substitutes any character not in brackets (Example: G[!ao]t matches Gill, Gut and not Good, goat)

Enforcing database security

Several data security tools are available in databases such as *password protection*, *encryption* (scrambling up characters so that they cannot make sense to attacking programs unless they are decrypted), *hiding* database objects and *user level security*

KCSE Revision Questions

KCSE 2012 Paper 1

Qn.20. a) With the aid of a diagram, describe the hierarchical database model. (4 marks)

KCSE 2009 Paper 1

Qn.17. d) Name and describe any two types of database models. (6 marks)

KCSE 2007 Paper 1

Qn.13. Differentiate between the following pairs of terms as used in database design: b) Table and query (2 marks)

KCSE 2012 Paper 1

Qn.20. c) i) Name three types of validation checks during data entry. (3 marks)

KCSE 2011 Paper 1

Qn.13. State the purpose of each of the following in database design. a) Input mask (1 mark) b) Default value (1 mark)

Paper 1

Qn.18. a) Using two examples, explain the term field properties as used in database design.

b) Below is an extract from a hospital database table.

Patient No	Name	Date Registered	Amount Paid	Remarks
LDK/001	Mathew Olang	04/05/08	2500.00	To go for X-ray
LDK/004	Joy Chelimo	07/06/08	1200.00	Medicine to be ordered
LDK/008	Joy Kamau	09/08/08	3500.00	To be admitted for further check up
LDK/002	Gerald Wasike	02/04/05	800.00	To come back for review

vii) State with reasons the most suitable data types for the following fields: (8 marks)

Patient

No Date registered

Amount paid

viii) Which would be the most appropriate primary key field for the above table? (1 mark)

ix) What is the purpose of a primary key field in database design? (1 mark)

KCSE 2008 Paper 1

Qn.19. The information below is maintained by a patron of a wildlife club in a school. Study it and answer the questions that follow.

Name	Class	Admission Number	Membership Number	Group
Mary	4E	3740	S001	Serengeti
Gupta	3W	3802	T001	Tsavo
Carey	2N	3949	T003	Mara
Gregory	4W	3762	M001	Amboseli
Sanjay	3N	3800	A001	Serengeti
Mariam	2E	3925	S002	Nairobi
Josephine	2W	3926	N001	Aberdare
Elvis	4N	3746	AB001	Tsavo
Carey	3E	3805	T002	Nairobi
Gordon	1W	4029	N002	Mara
Paul	1N	4013	M002	

a) Describe the field values, records and file. (3 marks)

b) State the most appropriate primary key for the list. (1 mark)

c) State the most appropriate data type for the fields:

i) Admission number (1 mark)

ii) Membership number. (1 mark)

d) If a database was to be created for the list; Forms, Tables, Queries and Reports are likely to be used.

i) State the purpose of each of these objects. (4 marks)

ii) Which objects cannot be used to store the data in the list? (3 marks)

e) i) How many field values are in the list? (1 mark)

ii) How many records are in the list? (1 mark)

KCSE 2007 Paper 1

Qn.20. a) A head teacher keeps the following student details in a database: Name, Address, Town, Date of birth, Marks scored, Fees paid.

i) Name the most appropriate primary key. Give a reason. (2 marks)

ii) For each item in the student's details above, indicate its most appropriate data type as used in the database. (3 marks)

iii) Explain why input screens are better data entry designs than entering data directly to a table. (2 marks)

c) Distinguish between:

i) A table in word-processing application and a table in a database application (2 marks)

KCSE 2007 Paper 1

Qn.19. b) A students' database comprises of students' details table and fees received table as shown below:

Students' details table

Surname
Middle Name
First Name
Admission Number

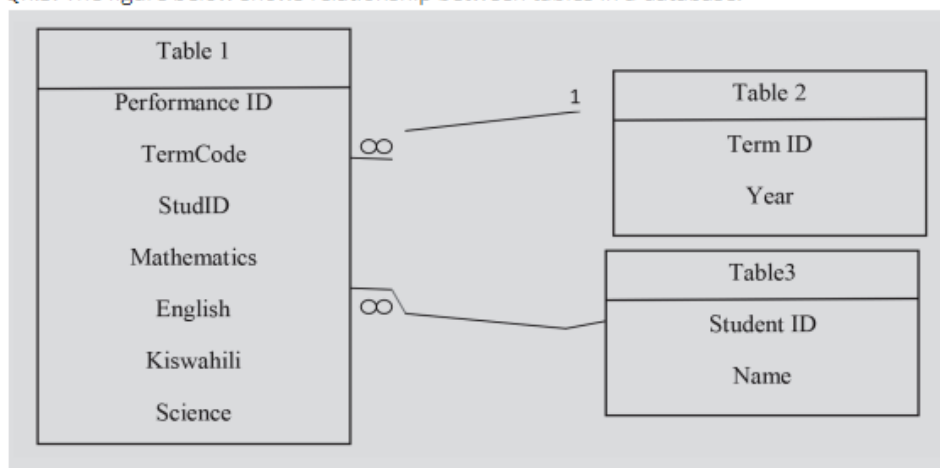
Fees received table

Date Amount
Receipt Number
Course

- State the primary key field for each table.
- State the field which should serve as the linking field for the two tables. (2 marks)

KCSE 2015 Paper 1

Qn.3. The figure below shows relationship between tables in a database.



Identify two primary and two foreign keys used in the relationship.

KCSE 2012 Paper 1

Qn.11. Describe the following types of relationships as used in Database design:

- One-to-one
- One-to-many

KCSE 2009 Paper 1

Qn.17. A lecturer keeps the following student details in a database: name, age, and course.

- Write an expression you would use to compute the year of birth of a student using this year as the current year. (2 marks)
- What query expressions would the lecturer use to list the students whose age is above 15 years and below 25 years? (3 marks)
- Which expression would the lecturer use to generate:
 - The number of students in the database? (2 marks)
 - The mean age of the students in the database? (2 marks)

Unit 4. Desktop Publishing (DTP)

Introduction and Definition

Publishing is the act of producing publications like newspapers, cards, pamphlets, pictures and calendars of professional quality. In the modern era, the process of publishing has changed because of the advent of personal computers and digital printers that are able to produce high quality publications.

Definition

Desktop Definition is the act of creating visual communications such as brochures, business cards, greeting cards, web pages and posters among others.

Desktop publishing software is application software for graphics design. Examples of DTP software include Adobe PageMaker, Microsoft Publisher, Quick Xpress, Adobe In Design, Ventura, Serif page plus and Apple page 2.

Purpose and Advantages of desktop publishing software

- i) Can create complex text and graphics.
- ii) Allows the user to create various page layouts.
- iii) Allows the user to print the publications.

Advantages of using desktop publishing software

- Gives the user power to manipulate text and graphics and control of the page layout.
- The graphics and text manipulation capabilities of a DTP software far outweigh those of a word processor.
- Items can be edited and formatted independently.
- Allows the user with a wide range of templates.
- Allows a common setting on master pages which can then be repeated on other pages.
- Allows production of commercial publications.
- It allows the user to come up with a wide variety of publications.
- The frames do not necessarily have to be arranged in a particular order.

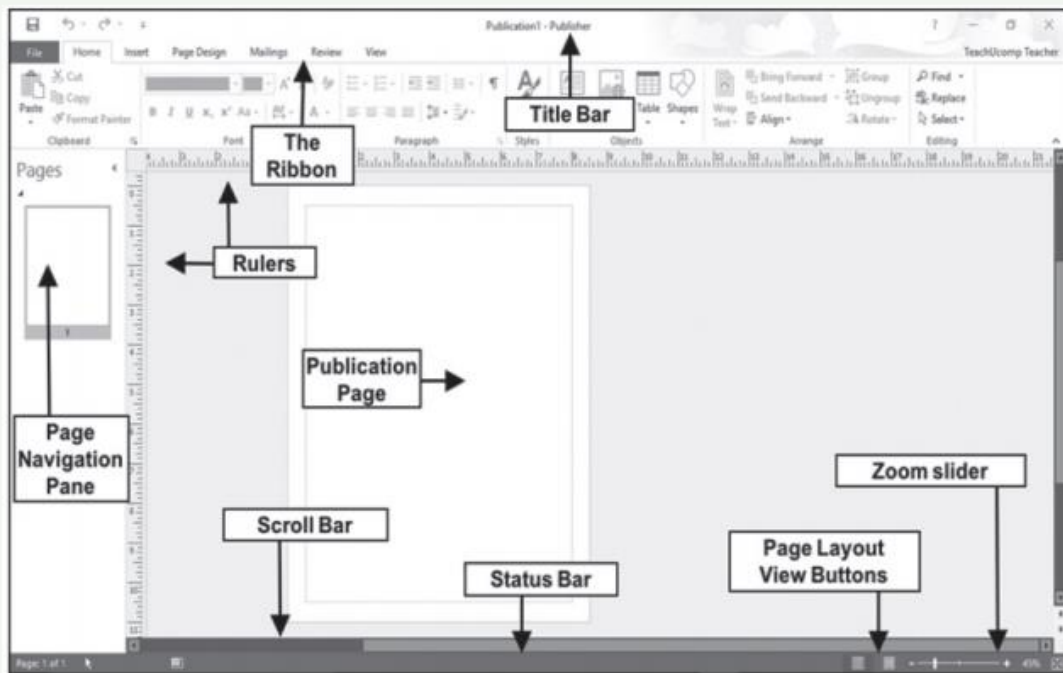
Designing a publication and Types of desktop publishing software

Designing a publication

Desktop publishing software allows the user to design a variety of publications for print such as business cards, calendars, banners, billboards, certificates, books, newspapers, among others.









Graphical based: Manipulate graphic objects. **Layout based:** Assist the user to come up with a variety of layouts.

Microsoft Publisher window

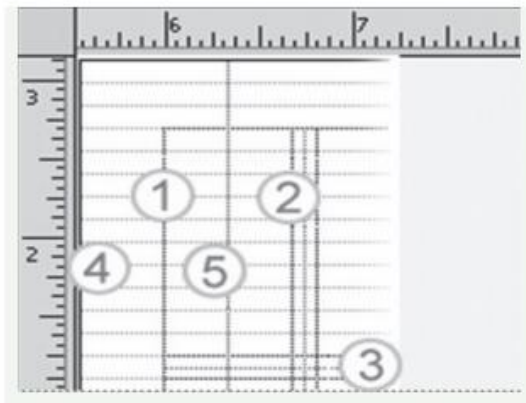


Ms publisher window has the following features

- a) **The pasteboard** - Areas that hold text and graphics during page layout.
- b) **Toolbox** - Set of buttons that contains various tools that you can use to create and manipulate publications.
- c) **Rulers** - Vertical and horizontal guides. They are used to guide placement of text and graphics to the required positions.
- d) **The printable area** - This is the area surrounded by margins.
- e) **Master pages** - This is used to lay a common layout foundation for all pages.
- f) **Control palette** - Toolbar with formatting commands for text and graphics.

Tool	Toolbox	Cursor	Use
Pointer Tool			Used to select items, text, or a location once an item has been selected, it can be resized moved, copied or deleted.
Text Tool	T	I	Enables text entry and editing
Rotating Tool		*	Rotates text, drawings or graphics
Cropping Tool			Allows custom trimming of graphics
Line Tool		+	Draws straight lines at any angle. See Elements, Lines for options
Constrained line Tool		+	Draws horizontal, vertical and 45 degree lines. See Elements, Line for option.
Rectangle Tool		+	Draws rectangles. To draw squares, hold the SHIFT key before clicking and dragging
Rectangle frame Tool		+	Creates rectangular placeholders for text and graphics. To create square placeholders, hold down the SHIFT key before clicking and dragging.

Layout Guides



- 1. **Margin guides** - Show you where your page margins lie.
- 2. **Column guides** - Help you keep your page aligned.
- 3. **Row guides** - Help you keep your page aligned.
- 4. **Baseline guides** - Assist a user to align objects.
- 5. **Ruler guides** - Assist in accurate positioning objects vertically or horizontally.

Setting up a publication and Manipulating text and graphical objects

Setting up a publication

This is the process of creating a publication of one's choice. It involves the following features:

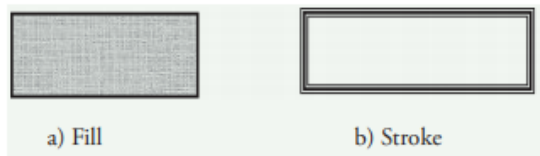
- Master pages
- Margin guides

This involves adjusting text and graphics in a publication using the available drawing tools.

i) Manipulating text The Text Frame defines the space you want the text to occupy.

ii) Manipulating graphical objects Graphical objects can be formatted using a drawing tool.

Drawing tool - This is a tool that allows the user to create an illustration or a publication. All these tools enable a person to apply stroke and fill patterns.



Other manipulating tools include:

- Rotating object.
- Copying and moving objects
- Wrapping text around a graphical object.
- Cropping an object.
- Grouping and ungrouping objects.

Editing a publication, Formatting a publication and Printing a publication in Ms Publisher

Editing a publication

A publication could undergo editing using tools such as Spelling and Grammar checker. Editing would include the process of find and replace, correcting spelling mistakes, replacing words as well as proofreading.

Applying various styles to enhance the appearance of text and graphics a publication.

iii) Text and paragraph formatting

Text and paragraphs can be formatted using the following tools and features:

- Changing text color
- Changing the case
- Superscript and subscript
- Drop cap
- Setting indents and tabs
- Column guides
- Page numbering
- Headers and Footers
- Page and column breaks
- Tracking and Kerning
- Line spacing

Printing a publication in Ms Publisher

Printing in desktop publishing is more technical. You may prefer to print a picture in composite grayscale for purpose of off-set printing. You can also show crop marks.

KCSE Revision Questions

KCSE 2017 Paper 1

Qn.15. Identify four tasks that can be achieved using a desktop publishing program for the following list of tasks. (2 marks)

- i) Managing students records in school.
- ii) Creating a calendar.
- iii) Designing a budget structure.
- iv) Creating a banner.
- v) Creating a book cover.
- vi) Processing of examination results.
- vii) Creating business cards.

KCSE 2007 i) Paper 1

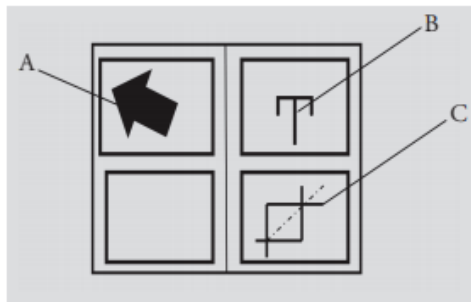
Qn.12. List four types of publications that can be designed by using desktop publishing software. (3 marks)

KCSE 2013 Paper 1

Qn.12. Explain why a DTP application would be preferred to a word processing application when designing a publication. (2 marks)

KCSE 2012 Paper 1

Qn.13. The figure below is a toolbar for DTP package.



State the functions of the tools labeled A, B and C.

A (1 mark)

B (1 mark)

C (1 mark)

KCSE 2015 Paper 1

Qn.19. ii) Describe two layout guides in desktop publishing program (DTP) that assist a user to place an object in a preferred position. (4 marks)

Unit 5 Internet and Email

Introduction, Brief history and development of the internet

In the modern times, efficient modes of communication based on electronic tools such as laptops and mobile phones which are connected through the Internet have become the standard modes of communication.

The Internet

It is a global interconnection of computers and other internet enabled devices for the purpose of communication and sharing of resources such as data, information, programs and printers among others.

Brief history and development of the Internet

- The first networking protocol used on the ARPANET was the Network Control Program.
- In 1983, it was replaced with the TCP or IP protocol invented by Robert Kahn, Vinton Cerf, and others, which quickly became the most widely used network protocol in the world.
- In 1990, the ARPANET was retired and transferred to the NSFNET.
- By 1990s, the differences among the networks in each of the countries had disappeared, and the U.S name; Internet began to be used to mean the entire worldwide system of networks that used the Internet TCP or IP protocols. A **Protocol** is a set of rules and standards that computers use to communicate with each other over a network.

Importance of the Internet and Advantages of the internet

- a) It is a research tool in new developments of products, competitors, market news and customer opinions and feedback.
- b) It enables advertisement and marketing of goods and services via web pages on a 24-hour basis.
- c) It is a source of entertainment through games, songs, movies, online TV channels etc.
- d) Supports communication especially by use of Electronic mail (e-mail). In addition, you can have live, interactive conversations with people around the world.
- e) It stores data by use of cloud computing.

Advantages of Internet

Internet is a Wide Area Network (WAN) and has the following advantages:

- i) Enables sharing of expensive peripherals like laser printers, modems and servers etc.
- ii) Enables sharing of all kinds of information on every topic, held on one computer across a number of users.
- iii) It enables applications/programs to be shared across a network by use of NetWare.
- iv) Used to facilitate "group working".
- v) Facilitates telecommuting. For example, the office at home where users can conveniently work from any part of the geographical stations and link to their offices remotely.
- vi) Facilitates communication between users and terminals such as video conferencing and email.
- vii) Eliminates duplication of tasks (redundancy).
- viii) Reduces costs and delays in processing and transmitting data.

Some of the unique characteristics of Internet making it popular include:

- i) The internet technology makes responses to be instantaneous.
- ii) Geographical spread of internet enabled devices is currently very wide meaning a large population can use it.
- iii) It is easy creating a network with people or organisations with similar concerns.
- iv) It can create confidentiality to some degree especially when the user intends to be anonymous or shy.
- v) Because of non-physical content during communication, it is less vulnerable to attack during transmission of signals in comparison to manual ways of communicating.

Disadvantages of Internet

- i) The cost of hardware, software and cabling is high.
- ii) The Internet is not owned by an individual or organisation hence difficult to control.
- iii) Security is a major concern over the Internet. For example, malware, predators and cyber bullying if adequate procedures are not adopted.
- iv) Not all information on the internet is correct. Anyone can post anything, and much with it is garbage.
- v) Some people are addicted to the internet and thus cause problems with their interactions of friends and loved ones.
- vi) Spread of pornography, terrorism and other vices can get in the hands of young children too easily.
- vii) A lot of time is lost and wasted on the internet.

Telecommuting, advantages and disadvantages of home based work

The office at home where users can conveniently work from any part of the geographical stations and link to their offices remotely. This is called telecommuting. It is also called teleworking.

Advantages of home based work

Saves travel costs by the workers. No need to physically converge to an office.

- No necessity to live within traveling distance to the office as you can have access remotely.
- Flexible hours of work and not necessarily between 8am to 5pm.
- Saving for the institutions in terms of renting expensive city-centre offices and learning areas or premises.

Disadvantages

- Loss of social contact between the clients.
- Need for quiet workroom at home. This can be difficult in a small flat or noisy estates.
- The difficulty of 'office' accommodation is compounded when two or three members of a family all work at home.
- Loss of visible status for senior staff in terms of a 'plush' office and other staff to command.
- The cost of hardware, software and cabling is out of reach to so many people. The network communication cost is out of reach too (expensive bandwidths).
- So many homes are not supplied with electricity making it impossible to use battery backups.

Advantages of home based work

- Saves travel costs by the workers. No need to physically converge to an office.
- No necessity to live within traveling distance to the office as you can have access remotely.
- Flexible hours of work and not necessarily between 8am to 5pm.
- Saving for the institutions in terms of renting expensive city-centre offices and learning areas or premises.

Disadvantages

- Loss of social contact between the clients.
- Need for quiet workroom at home. This can be difficult in a small flat or noisy estates.
- The difficulty of 'office' accommodation is compounded when two or three members of a family all work at home.
- Loss of visible status for senior staff in terms of a 'plush' office and other staff to command.
- The cost of hardware, software and cabling is out of reach to so many people. The network communication cost is out of reach too (expensive bandwidths).
- So many homes are not supplied with electricity making it impossible to use battery backups.

Internet connectivity

Requirements before you can connect to the Internet include:

- a) Data Terminal Equipment (DTE) such as a computer or internet enabled device such as smartphones, Personal Digital Assistants (PDEs). Remember not all DTEs can send or receive data signals via internet.
- b) Transmission medium: this is the physical or wireless path which acts as a channel or link through which messages travel from sender to receiver such as twisted pair, satellite.
- c) MODEM - a Data Communication Equipment (DCE) which converts digital signal from a transmitting computer to analogue and from analogue to digital signals on the receiving computer. A modem is used in case where a computer is used.
- d) Internet Software - often installed with your operating system or can be downloaded from the Internet such as Web browser, internet protocols, and email software. Web browsers usually allow the user to navigate (surf) the web pages such as Netscape Navigator, Chrome, Microsoft's Internet Explorer, Mosaic, Opera, and Mozilla.
- e) An Internet Service Provider (ISP) is a company that connects your home or office computer to the Internet at a fee. Examples are Zuku, Safaricom, Airtel, Telkom, Faiba, Access Kenya.

Internet services

- a) **Communication** - One can exchange information through e-mails, video-conferencing, chat rooms and newsgroups.
- b) **E-commerce** - Buying and selling of goods and services over the internet. Currently, you can access cyber shops for online purchasing and pay for the services through electronic funds transfer (EFT), cheque and credit cards among others.
- c) **Advertisement and marketing** - Through creating a web site it enables a business to be visible worldwide at a cheaper cost. This can also boost sales internationally, those who create websites are known as web designers, webmaster, web programmers or web developers.
- d) **Research and browsing** - Researchers and scholars use Internet to access digital (virtual) libraries for the latest information and archives.
- e) **Entertainment** - Users can watch online TVs, videos and play games.
- f) **Education and E-learning** - Academic materials for all levels of education are readily available on the Internet.
- g) **Discussion group** - Is a collection of users who join together to discuss some topic such as cookery, politics, education, recreational and scientific research.
- h) **Telnet** - Logging into a remote computer and work on it as your local computer. Remember telecommuting
- i) **File transfer** - Data in the form of files can be transferred across the Internet from one site to another using the File Transfer Protocol (FTP).
- j) **Software downloads** - Users can download program from remote computers to their computers such as antivirus software update.
- k) **Search engines or search services** - Software that helps in locating information in the Web for any information that you want to find, especially when you do not know where to find it. Examples of search engines include Google, Bing, Yahoo, Ask. com, AOL.com, Baidu.

Information on the Internet is made available through the following items

- a) **Website**: A collection of web pages stored as a file in a special type of a computer called web server. Every website is accessed using a unique address known as Uniform Resource Locator (URL) such as <https://www.knec.ac.ke>.
- b) **Web portal** - A web site that provides an excellent starting point for exploring the net. They let users to type a word or phrase to quickly search for information on the web. They also allow users to browse or search by categories. Examples of web portals, excite.com, ananzi.co.za, netscape.com, msn.com, yahoo.com
- c) **Blog** - A regularly updated website or web page, typically run by an individual or small group and is written in an informal or conversational style.
- d) **Multimedia** - A term used in computing concerned with controlled integration of text, graphics, drawings, still pictures, videos, animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally.

Common protocols used in Internetworking

- **Transmission Control Protocol (TCP)** - Governs how data is transferred from one DTE to another over the Internet.
- **Internet Protocol (IP)** - Determines the unique addressing of communication devices on the internet.
- **Hypertext Transfer Protocol (HTTP)** - A language that web clients and servers use to communicate with each other in order to send and receive data signals or messages.

Accessing Internet services

We shall discuss two services offered here mainly browsing and emailing.

- a) **Web browsing**
 - To navigate or move around the web pages you require a web browser. A web browser is a program that lets the user surf through information on the internet. Information on the Web is structured into pages with each having a specific address that is used to locate and access information on that page called URL. Users navigate the pages by use of hyperlinks.
 - **Hyperlinks** are clickable texts or objects which connect users to different pages of the web document. If they are made up of text only, they are referred to as **hypertext**. Others made up of non-texts are referred to as **hyper objects**.
 - During browsing a user can upload or download data and files.
 - o Upload when you send data or information from your computer terminal to another computer on the net.
 - o Download when you receive and store information from another computer on the Internet. Lifting information from another Internet computer.
 - **Home page** is the first page that appears each time you start your web browser or open a web site.

Electronic mail (E-Mail)

Defination of terms

- i) **Postal mail**: This is the conventional regular postal service delivery of letters and paper messages to the recipient's local post office whose implication means, it is very slow i.e. Snail Mail.
- ii) **Facsimile (Fax)**: Is a telephone transmission of scanned and printed material (text or image) usually to a telephone number associated with a printer. The receiving Fax machine reconverts the coded image and prints a paper copy of the document. It is reliable, secure, faster and easy to use.
- iii) **Electronic mail (E-mail)**: Refers to the sending and receiving of electronic letters and documents on the Internet as opposed to postal mail.

Advantages of emails over the traditional paper mail or 'snail mail'

- It is very fast.
- It is low cost, almost free.
- It is convenient to access from any internet enabled device anywhere anytime.
- Easy to send one mail to many recipients by use of carbon copies.
- Can be saved for future retrieval.
- Easy to send and reply. It does not require a lot of training to browse.
- Can easily be forwarded to another recipient.
- Document created using other application can easily be attached to the mail.
- Reliable if all email etiquette and netiquette is observed.

Disadvantages of emails

- Security of message may not be guaranteed – due to tapping while on transit.
- Lack of infrastructure.
- The cost of calling is still very high.
- Requires some ICT literacy to use and enjoy.
- Unsolicited emails (spams) clog the computer memory while others are malware.

Email requirements

Any user accessing an email must have the following items:

- a) A computer or an internet enabled device to send or receive the e-mail messages.
- b) An e-mail program allows users to send, receive and manage e-mail messages.

Popular email programs include, Gmail, Hotmail. com, Yahoo.com, Microsoft outlook express, qualcomm eduro pro.

- c) A unique e-mail address of the sender and the recipient. An email address directs a message to the recipient.
- d) An Internet Service Provider (ISP) - Company who will deliver your message to the receiver.

Parts of an e-mail compose window

The figure below illustrates a Gmail email software display window when the compose button is clicked.



To: -The email address of the receiver.

Cc: -Contains the e-mail addresses of each recipient, when you want to send copies of the message to multiple users at the same time. **Bcc:** - Blind Carbon Copy (Bcc) is used when sending the message to multiple recipients however their names are hidden from other recipients of the message.

Subject: - An appropriate title of the email message.

Attachments: - One can add documents, pictures, sound, videos, programs among others to message.

Email body: The large rectangular box where the sender types in the message to be sent before clicking the send command button. **Note:** A message that returns to the sender because it cannot reach its destination is referred to as a bounced message.

E-mail addresses

It defines location of an individual mailbox on the internet.

Parts of an e-mail address consists of two parts separated by the @ (at) symbol The left part contains the **user name**. For example, the name of the person's account. This can be real or nickname.

The right part (second part) is known as the **domain name**. It is the location of the person's account on the Internet. Full stops (.) separates the various parts of the domain name such as *mikena2000@gmail.com*.

Organisation or country domains

The last few characters in an email address usually indicate the domain type or the region or both.

Top level	Domain	Country	Region code
com	commercial	au	Australia
edu	education	ca	Canada
gov	government	it	Italy
mil	military	jp	Japan
net	network	ke	Kenya
org	organisation (Often non-profit)	ug	Uganda

Examples of current domain levels include:

ac.ke –academic institution in Kenya

co.ke commercial entity located in Kenya

go.ke government entity located in Kenya

Example

http://www.knec.ac.ke - Website for Kenya National Exam Council

E-mail features

- **Inbox** - It contains received mails
- **Outbox** - It contains sent mail or waiting sending/ delivery.
- **Attachments** - You can attach document/picture/ sound/video/program to your message.When attaching a file keep the size of your attachment small. Attachment is an example of uploading.
- **Downloading** - Enables attached messages to be downloaded before they can be accessed.
- **Forwarding a message** - After reading a message, you can add comments and then send the message to a friend or colleague. This is called forwarding.
- **Printing a message** - Enables printing a message to produce a hard/paper copy

Use of Internet to access information on emerging issues

The early years of the 21st century have witnessed an explosion in the Internet usage and the interconnected network keeps growing.

a) Positive effects of the internet

- **Easy research:** It is easier to do research and gather information on materials relevant to their research topics.
- **Enhanced communication:** Communication with family, friends and relatives is faster.
- **Creation of jobs:** There is a great possibility to earn while working from home.
- **Easy for doing business:** Faster business transactions and cheaper products has been enhanced.
- **Savings on travel cost:** Through the use of the internet, it is possible for executives or business managers to do teleconferencing.

b) Negative effects of Internet in recent times include:

- **Lack of face to face communication:** Many people find it easier to communicate through the Internet instead of the traditional direct way. This limits one on one interactions.
- **Cyber bullying:** People use internet to bully or harass others, for example, on social media sites.
- **Disrupted privacy:** Because of free information people tend to exchange private data such as pictures, cell phone numbers, and ID numbers unknowingly. These data can easily land in the wrong hands or hacked.
- **Insecurity:** It has made it easier for criminal elements to access private data belonging to organisations and individuals in order to advance their malicious intents.
- **Immorality and cultural erosion:** A lot of pornographic materials are easily accessible to teenagers leading to premarital sex, early teen pregnancies, Sexually Transmitted Diseases (STD) and HIV and AIDS, drugs and substance abuse.
- **Viruses:** Malicious programs spread very fast through the internet which could lead to data losses.

KCSE Revision Questions

KCSE 2016 Paper 1

Qn.4. Explain two ways in which the use of Internet could make reporting of corruption easier. (4 marks)

KCSE 2006 Paper 1

Qn.13. a) What is meant by the term e-learning? (1 mark) b) A school intends to set-up an e-learning system. List three problems that are likely to be encountered. (3 marks)

KCSE 2013 Paper 1

Qn.19. A worker is unable to travel to the office but may still be able to do the office work through telecommuting.

c) Explain two benefits that the employer will get by allowing the worker to do the office work through telecommuting. (4 marks)

KCSE 2010 Paper 1

Qn.10. Explain why telecommuting is NOT suitable for a doctor when carrying out an operation. (2 marks)

KCSE 2004 Paper 1

Qn.20. a) With the improvement in price and performance of computers and communication equipment, it will be possible for people in various business organisations to work from home. Such working using a PC as a remote terminal is often described as teleworking. State three advantages and three disadvantages of working from home. (12 marks)

KCSE 2015 Paper 1

Qn.5. a) Write the acronym MODEM in full. (1 mark) b) Explain the purpose of a modem when connecting to the internet. (2 marks)

KCSE 2008 Paper 1 Qn.

17. b) List six activities performed on the web. (3 marks)

c) An institution has ten stand-alone computers.

ii) State the necessary steps required to connect the computers to the internet. (4 marks)

KCSE 2006 Paper 1

Qn.19. c) i) What is a search engine? (1 mark)

ii) The internet can be used to source information about emerging issues that may not be available in print form.

Give two advantages and two disadvantages of information obtained from the internet. (4 marks)

KCSE 2012 Paper 1

Qn.9. State two: b) Protocols used in sending and receiving of emails. (1 mark)

KCSE 2009 Paper 1

Qn.11. a) i) What is an internet protocol (IP) address? (1 mark)

ii) Why is an IP address necessary? (1 mark)

KCSE 2008 Paper 1

Qn.4. Describe the term 'home page' as applied in the internet. (2 marks)

KCSE 2007 Paper 1

Qn.16. c) Define the following web related terms:

i) Web browser (1 mark)

ii) Hyperlink (1 mark)

iii) Hypertext document. (1 mark)

KCSE 2003 Paper 1

Qn.20. c) Give two differences between post office mail and electronic mail (e - mail). (2 marks)

KCSE 2012 Paper 1

Qn.9. a) State two functions of e-mail software. (1 mark)

KCSE 2014 Paper 1

Qn.3. a) Differentiate between Bcc and cc in an email. (2 mark)

b) Explain why a worker may use each of the following:

email; (2 marks)

fax; (2 marks)

Paper 1

Qn.3. a) Differentiate between Bcc and cc in an email. (2 mark)

Qn.3. a) Differentiate between Bcc and cc in an email. (2 mark)

KCSE 2009 Paper 1

Qn.11. b) What is the purpose of the following internet domains?

i) .org (1 mark)

ii) .gov (1 mark)

KCSE 2011 Paper 1

Qn.19. a) What is meant by each of the following terms as used in the internet?

i) Surf (1 mark)

ii) Uploading (1 mark)