

ICT

TEACHER'S GUIDE

SENIOR6

ASSOCIATE NURSING PROGRAM

First Edition

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FOREWORD

Dear teacher,

Rwanda Basic Education Board is honoured to present teacher's guide for associate nursing program which assists the teacher as guidance to the competence-based teaching and learning to ensure consistence in the learning of ICT subject. The Rwandan educational philosophy is to ensure that student-associate nurses achieve full potential at every level of education which will prepare them to be able to respond to the community health needs and exploit employment opportunities.

In line with efforts to improve the quality of education, the government of Rwanda emphasizes the importance of aligning teaching and learning materials with the syllabus to facilitate their learning process. Many factors influence what they learn, how well they learn and the competences they acquire. Those factors include the relevance of the specific content, the quality of teacher's pedagogical approaches, the assessment strategies and the instructional materials available.

We paid special attention to the activities that facilitate the learning process in which student-associate nurse can develop ideas and make new discoveries during concrete activities carried out individually or with peers. With the help of the teacher, student-associate nurse will gain appropriate skills and be able to apply what they have learnt in real life situations. Hence, they will be able to develop certain values and attitudes allowing them to make a difference not only to their own life but also to the nation. This is in contrast to traditional learning theories which view learning mainly as a process of acquiring knowledge from the more knowledgeable who is mostly the teacher. In competence-based curriculum, learning is considered as a process of active building and developing of knowledge and understanding, skills and values and attitude by the student-associate nurses where concepts are mainly introduced by an activity, situation or scenario that helps the student-associate nurses to construct knowledge, develop skills and acquire positive attitudes and values.

In addition, such active learning engages student- associate nurses in doing things and thinking about the things they are doing and they are encouraged to bring their own real experiences and knowledge into the learning processes.

In view of this, your role is to:

- Plan your lessons and prepare appropriate teaching and learning materials.
- Organize group discussions for student-associate nurse considering the importance of social constructivism suggesting that learning occurs more effectively when the student-associate nurses works collaboratively with more knowledgeable and experienced people.

- Engage student-associate nurses through active learning methods such as inquiry methods, group discussions, research, investigative activities, group and individual work activities.
- Provide supervised opportunities for student-associate nurses to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity innovation, communication and cooperation.
- Support and facilitate the learning process by valuing student-associate nurses' contributions in the class activities.
- Guide student-associate nurses towards the harmonization of their findings.
- Encourage individual, peer and group evaluation of the work done in the classroom and use appropriate competence-based assessment approaches and methods.

To facilitate you in your teaching activities, the content of this teacher's guide is self-explanatory so that you can easily use it. It is divided in 3 parts:

The part 1: Explains the structure of this teacher's guide and gives you the methodological guidance;

The part 2: Gives the sample lesson plans as reference for your lesson planning process;

The part 3: Provides the teaching guidance for each concept given in the student book.

Even though this teacher's guide contains the Answers to all activities given in the Student book, you are requested to work through each question and activity before judging the student's findings. I wish to sincerely extend my appreciation to the people who contributed towards the development of this Teacher's Guide, the Ministry of Health, Human Resource for Health Secretariat (HRHS), University of Rwanda, School of Nursing and Midwifery, Higher Learning Institutions and Rwanda Basic Education Board.

Special gratitude goes to University faculty, Nurses, Midwives, Teachers, illustrators, designers, HRH Secretariat Staff and REB Staff who diligently worked to successful completion of this book.

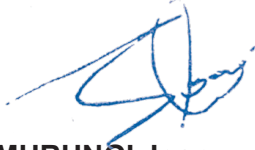
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ACKNOWLEDGMENT

I wish to sincerely express my special appreciation to the people who played a role in the development of this book. The process would not have been successful without the support from different stakeholders. My thanks first go to the Ministry of Health, Human Resources for Health Secretariat (HRHS) and all people who actively participated in the development of the program: These are the Rwanda Basic Education Board (REB), University of Rwanda (UR), College of Medicine and Health Sciences, Kibogora Polytechnic (KP), East African Christian College (EACC), Adventist University of Central for Africa (AUCA), Mount Kenya University, University of Gitwe, Institut Catholique de Kabgayi, Ruli Higher Institute of Health Sainte Rose de Lima (RHH), King Faisal Hospital (KFH), University Teaching Hospital of Kigali (CHUK), University Teaching Hospital of Butare (CHUB), Rwanda Military Hospital (RMH), Nemba District Hospital, the National Council of Nurses and Midwives (NCNM), the Rwanda Nurses and Midwives Union (RNMU), who availed their staff at various stages of the development of this associate Nursing Teacher 's Book. Furthermore, I owe gratitude to different partners more especially the Ministry of Education for their guidance, and the Clinton Health Access Initiative (CHAI) for its contribution to financial support.



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PART I. GENERAL INTRODUCTION

About the teacher's guide

This book is a teacher's guide for ICT subject, for Senior Six in Associate Nursing program. It is designed to accompany student book and intends to help teachers in the implementation of competence based curriculum specifically ICT syllabus.

As the name says, it is a guide that teachers can refer to when preparing their lessons. Teachers may prefer to adopt the guidance provided but they are also expected to be more creative and consider their specific classes' contexts and prepare accordingly.

I.0. The structure of the guide

This section presents the overall structure, the unit and sub-heading structure to help teachers to understand the different sections of this guide and what they will find in each section.

Overall structure

The whole guide has three main parts as follows:

- **Part I: General Introduction.**

This part provides general guidance on how to develop the generic competences, how to integrate cross cutting issues, how to cater for students with special educational needs, active methods and techniques of ICT and guidance on assessment.

- **Part II: Sample lesson plan**

This part provides a sample lesson plan, developed and designed to help the teacher develop their own lesson plans.

- **Part III: Unit development**

This is the core part of the guide. Each unit is developed following the structure below. The guide ends with references.

Each unit is made of the following sections:

- **Unit title:** from the syllabus

- **Key unit competence:** from the syllabus
- **Prerequisites (knowledge, skills, attitudes and values)**

This section indicates knowledge, skills and attitudes required for the success of the unit. The competence-based approach calls for connections between units/topics within a subject and interconnections between different subjects. The teacher will find an indication of those prerequisites and guidance on how to establish connections.

- **Cross-cutting issues to be addressed**

This section suggests cross cutting issues that can be addressed depending on the unit content. It provides guidance on how to come up with the integration of the issue. Note that the issue indicated is a suggestion; teacher are free to take another cross-cutting issue taking into consideration the learning environment.

- **Guidance on the introductory activity**

Each unit starts with an introductory activity in the teacher’s book. This section of the teacher’s guide provides guidance on how to conduct this activity and related answers. Note that students may not be able to find the right solution but they are invited to predict possible solutions or answers. Solutions are provided by students gradually through discovery activities organized at the beginning of lessons or during the lesson.

- **List of lessons/sub-heading**

This section presents in a table suggestion on the list of lessons, lesson objectives copied or adapted from the syllabus and duration for each lesson. Each lesson / subheading is then developed.

- **End of each unit**

At the end of each unit the teacher provides the following sections:

- Summary of the unit which provides the key points of content developed in the teacher’s book.
- Additional information which provides additional content compared to the student book for the teacher to have a deeper understanding of the topic.
- End unit assessment which provides answers to questions of the end unit assessment in the teacher’s book and suggests additional questions and related answers to assess the key unit competence.
- Additional activities :(remedial, consolidation and extended activities). The purpose of these activities is to accommodate each student (slow, average and gifted) based on the end of unit assessment results.

Structure of each sub heading

Each lesson/sub-heading is made of the following sections:

Lesson /Sub heading title 1:

– Prerequisites/Revision/Introduction:

This section gives a clear instruction to teacher on how to start the lesson.

– Teaching resources

This section suggests the teaching aids or other resources needed in line with the activities to achieve the learning objectives. Teachers are encouraged to replace the suggested teaching aids by the available ones in their respective schools and based on learning environment.

– Learning activities

This section provides a short description of the methodology and any important aspect to consider. It provides also answers to learning activities with cross reference to student's book.

– Exercises/application activities

This provides questions and answers for exercises/ application activities.

1.1. Methodological guidance

1.1.1. Developing competences

Since 2015 Rwanda shifted from a knowledge based to a competence based curriculum for pre-primary, primary and general secondary education. For TTCs, it is in 2019 that the competence based curriculum was embraced. This called for changing the way of learning by shifting from teacher centered to a learner centered approach. Teachers are not only responsible for knowledge transfer but also for fostering teacher's learning achievement, and creating safe and supportive learning environment. It implies also that a student has to demonstrate what he/she is able to do using the knowledge, skills, values and attitude acquired in a new or different or given situation.

The competence-based curriculum employs an approach of teaching and learning based on discrete skills rather than dwelling on only knowledge or the cognitive domain of learning. It focuses on what learner can do rather than what learners know. Students develop basic competences through specific subject unit competences with specific learning objectives broken down into knowledge, skills and attitudes. These competences are developed through learning activities disseminated in learner-centered rather than the traditional didactic approach. The students are

evaluated against set standards to achieve before moving on.

In addition to specific subject competences, students also develop generic competences which are transferable throughout a range of learning areas and situations in life. Below are examples of how generic competences can be developed in ICT:

Generic competence	Examples of activities that develop generic competences
Critical thinking	<ul style="list-style-type: none"> – Describe the relationship and interdependence of sciences – Observe, record, interpret data recorded during experiments – Identify and use the applications of ICT concepts to solve problems of life and society
Research and Problem solving	<ul style="list-style-type: none"> – Research using internet or books from the library – Design a project for making bioplastics – Design a questionnaire for data collection during field visit
Innovation and creativity	<ul style="list-style-type: none"> – Create an experiment procedure to prove a point – Develop a graph to illustrate information – Design a data collection survey/questionnaire – Conduct experiments with objectives, methodology, observations, results, conclusions – Identify local problems and ways to resolve them
Cooperation, Personal and Interpersonal management and life skills	<ul style="list-style-type: none"> – Work in Pairs – Small group work – Large group work
Communication	<ul style="list-style-type: none"> – Organise and present in writing and verbally a complete and clear report of an experiment – Observe, record, interpret the results of a measurement accurately. – Select and use appropriate formats and presentations, such as tables, graphs and diagrams.
Lifelong learning	<ul style="list-style-type: none"> – Exploit all opportunities available to improve on knowledge and skills. Reading scientific journals to keep updated.

I.2.2. Addressing cross cutting issues

Among the changes in the competence based curriculum is the integration of cross cutting issues as an integral part of the teaching learning process-as they relate to and must be considered within all subjects to be appropriately addressed. The eight cross cutting issues identified in the national curriculum framework are: genocide studies, environment and sustainability, gender, Comprehensive Sexuality Education (CSE), Peace and Values Education, Financial Education, standardization Culture and Inclusive Education.

Some cross cutting issues may seem specific to particular learning areas or subjects but the teacher needs to address all of them whenever an opportunity arises. In addition, student should always be given an opportunity during the learning process to address these cross cutting issues both within and out of the classroom so as to progressively develop related attitudes and values.

Below are examples on how crosscutting issues can be addressed in ICT:

Cross-cutting issues	Examples on how to integrate the cross-cutting issues
Inclusive education	Involve all students in all activities without any bias. Eg: Allow a student with physical disability (using wheelchair) to take notes or lead the team during an experiment.
Gender	Involve both girls and boys in all activities: No activity is reserved only to girls or boys. Teacher should ensure equal participation of both girls and boys during experiments as well as during cleaning and tidying up related activities after experiments.
Peace and Values Education	During group activities, debates and presentations, the teacher will encourage students to help each other and to respect opinions of colleagues.
Standardization culture	<ul style="list-style-type: none">- Most ICT in Accounting require the use of software. Students should always be aware to use standard software products and use standard software- In addition, when using the different software students have to record data accurately.- For tasks involving calculations, they have to always present accurate results.

Environment and sustainability	<ul style="list-style-type: none"> – In order to avoid the environment pollution, students avoid throwing ICT materials away anywhere; special places or appropriate containers should be used. – Students also have to be aware of the impacts of the use of some products like cartridges, plastic components of ICT tools on the environment.
Financial Education	As this subject is for future Accountants, students should be encouraged to appreciate the financial benefits of the different ICT tools they use school compared to the situation in which those tools are not present

I.2.3. Attention to special educational needs specific to each subject

In the classroom, students learn in different way depending to their learning pace, needs or any other special problem they might have. However, the teacher has the responsibility to know how to adopt his/her methodologies and approaches in order to meet the learning needs of each student in the classroom. Also teacher must understand that students with special needs need to be taught differently or need some accommodations to enhance the learning environment. This will be done depending on the subject and the nature of the lesson.

In order to create a well-rounded learning atmosphere, teacher needs to:

- Remember that students learn in different ways so they have to offer a variety of activities (e.g. role-play, music and singing, word games and quizzes, and outdoor activities).
- Maintain an organized classroom and limits distraction. This will help students with special needs to stay on track during lesson and follow instruction easily.
- Vary the pace of teaching to meet the needs of each student-teacher. Some students process information and learn more slowly than others.
- Break down instructions into smaller, manageable tasks. Students with special needs often have difficulty understanding long-winded or several instructions at once. It is better to use simple, concrete sentences in order to facilitate them understand what you are asking.
- Use clear consistent language to explain the meaning (and demonstrate or show pictures) if you introduce new words or concepts.
- Make full use of facial expressions, gestures and body language.
- Pair a student who has a disability with a friend. Let them do things together and learn from each other. Make sure the friend is not over protective and does not do everything for the student-teacher. Both students will benefit from

this strategy

- Use multi-sensory strategies. As all students learn in different ways, it is important to make every lesson as multi-sensory as possible. Students with learning disabilities might have difficulty in one area, while they might excel in another. For example, use both visual and auditory cues.

Below are general strategies related to each main category of disabilities and how to deal with every situation that may arise in the classroom. However, the list is not exhaustive because each student is unique with different needs and that should be handled differently.

Strategy to help students with developmental impairment:

- Use simple words and sentences when giving instructions.
- Use real objects that the student can feel and handle, rather than just working abstractly with pen and paper.
- Break a task down into small steps or learning objectives. The student should start with an activity that s/he can do already before moving on to something that is more difficult.
- Gradually give the student less help.
- Let the student work in the same group with those without disability.

Strategy to help students with visual impairment:

- Help students to use their other senses (hearing, touch, smell and taste) to play and carry out activities that will promote their learning and development.
- Use simple, clear and consistent language.
- Use tactile objects to help explain a concept.
- If the students has some sight, ask them what they can see. Get information from parents/caregivers on how the student manages their remaining sight at home.
- Make sure the student has a group of friends who are helpful and who allow the students to be as independent as possible.
- Plan activities so that students work in pairs or groups whenever possible.

Strategy to help students with hearing impairment:

- Strategies to help students with hearing disabilities or communication difficulties
- Always get the students attention before you begin to speak.
- Encourage the student to look at your face.
- Use gestures, body language and facial expressions.
- Use pictures and objects as much as possible.

- Ask the parents/caregivers to show you the signs they use at home for communication use the same signs yourself and encourage other students to also use them.
- Keep background noise to a minimum.

Strategies to help children with physical disabilities or mobility difficulties:

- Adapt activities so that student who use wheelchairs or other mobility aids, or other students who have difficulty moving, can participate.
- Ask parents/caregivers to assist with adapting furniture e.g. The height of a table may need to be changed to make it easier for a student to reach it or fit their legs or wheelchair under.
- Encourage peer support friends can help friends.
- Get advice from parents or a health professional about assistive devices.

1.2.4. Guidance on assessment

Each unit in the teacher's guide provides additional activities to help students achieve the key unit competence. Results from assessment inform the teacher which student needs remedial, consolidation or extension activities. These activities are designed to cater for the needs of all categories of learners; slow, average and gifted learners respectively.

Assessment is an integral part of teaching and learning process. The main purpose of assessment is for improvement. Assessment for learning/ **Continuous/ formative assessment** intends to improve student-teachers' learning and teacher's teaching whereas assessment of learning/summative assessment intends to improve the entire school's performance and education system in general.

Continuous/ formative assessment

- It is an ongoing process that arises out of interaction during teaching and learning process. It includes lesson evaluation and end of sub unit assessment. This formative assessment plays a big role in teaching and learning process. The teacher should encourage individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.

In Year two textbook, formative assessment principle is applied through application activities that are planned in each lesson to ensure that lesson objectives are achieved before moving on. At the end of each unit, the end unit assessment is formative when it is done to give information on the progress of students and from there decide what adjustments need to be done. Assessment standards are taken into consideration when setting tasks.

Summative assessment

The assessment done at the end of the term, end of year, is considered as summative. The teacher, school and parents are informed on the achievement of educational objectives and think of improvement strategies. There is also end of level/ cycle assessment in form of national examinations.

1.2.5. Student teachers' learning styles and strategies to conduct teaching and learning process

There are different teaching styles and techniques that should be catered for. The selection of teaching method should be done with the greatest care and some of the factors to be considered are: the uniqueness of subjects, the type of lessons, the particular learning objectives to be achieved, the allocated time to achieve the objective, instructional available materials, the physical/sitting arrangement of the classroom, individual student teachers' needs, abilities and learning styles.

There are mainly four different learning styles as explained below:

a) Active and reflective learners

Active learners tend to retain and understand information best by doing something active with it, discussing or applying it or explaining it to others. Reflective learners prefer to think about it quietly first.

b) Sensing and intuitive learners

Sensing learners tend to like learning facts while intuitive learners often prefer discovering possibilities and relationships. Sensors often like solving problems by well-established methods and dislike complications and surprises; intuitive learners like innovation and dislike repetition.

c) Visual and verbal learners

Visual learners remember best what they see (pictures, diagrams, flow charts, time lines, films, demonstrations, etc.); verbal learners get more out of words (written and spoken explanations).

d) Sequential and global learners

Sequential learners tend to gain understanding in linear steps, with each step following logically from the previous one. Global learners tend to learn in large jumps, absorbing material almost randomly without seeing connections, and then suddenly "getting it."

I.2.6. Teaching methods and techniques that promote the active learning

The different student learning styles mentioned above can be catered for, if the teacher uses active learning whereby students are really engaged in the learning process.

What is Active learning?

Active learning is a pedagogical approach that engages students in doing things and thinking about the things they are doing. In active learning, learners are encouraged to bring their own experience and knowledge into the learning process.

The role of the teacher in active learning

- The teacher engages students through active learning methods such as inquiry methods, group discussions, research, investigative activities and group and individual work activities.
- He/she encourages individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.
- He provides supervised opportunities for students to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.
- Teacher supports and facilitates the learning process by valuing student-teachers' contributions in the class activities.

The role of learners in active learning

Learners are key in the active learning process. They are not empty vessels to fill but people with ideas, capacity and skills to build on for effective learning. A learner engaged in active learning:

- Communicates and shares relevant information with other learners through presentations, discussions, group work and other learner-centred activities (role play, case studies, project work, research and investigation)
- Actively participates and takes responsibility for their own learning
- Develops knowledge and skills in active ways
- Carries out research/investigation by consulting print/online documents and resourceful people, and presents their findings
- Ensures the effective contribution of each group member in assigned tasks through clear explanation and arguments, critical thinking, responsibility and confidence in public speaking
- Draws conclusions based on the findings from the learning activities.

Some active techniques that can be used in ICT

The teaching methods strongly emphasised in the competence Based Curriculum (CBC) are active methods. Below are some active techniques that apply in sciences:

A. Practical work/ experiments:

Many of the activities suggested in ICT curriculum as well as in the teacher's book are practical works or experiments.

Practical work is vital in learning ICT; this method gives the student the opportunity to implement a series of activities and leads to the development of both cognitive and hands-on skills. The experiments and questions given should target the development of the following skills in student-teachers: observation, recording and report writing, manipulation, measuring, planning and designing.

A practical lesson/Experiment is done in three main stages:

- **Preparation of experiment:** Checking materials to ensure they are available and at good state; try the experiment before the lesson; think of safety rules and give instructions to lab technician if you have any.
- **Performance of experiment:** Sitting or standing arrangement of student-teachers; introduction of the experiment: aims and objectives; setting up the apparatus; performing the experiment; write and record the data.
- **Discussion:** Observations and interpreting data; make generalisations and assignment: writing out the experiment report and further practice and research.

In some cases, demonstration by the teacher is recommended when for example the experiment requires the use of sophisticated materials or very expensive materials or when safety is a major factor like dangerous experiments and it needs specific skills to be learnt first.

In case your school does not have enough laboratory materials and chemicals, experiments can be done in groups but make sure every student participates. You can also make arrangements with the neighbouring science school and take your students there for a number of experiments.

B. Research work

Each student or group of students is given a research topic. They have to gather information from internet, available books in the library or ask experienced people and then the results are presented in verbal or written form and discussed in class.

C. Project work

ICT teachers are encouraged to sample and prepare project works and engage their students in, as many as possible. Students in groups or individually, are engaged in

a self-directed work for an extended period of time to investigate and respond to a complex question, problem, or challenge. The work can be presented to classmates or other people beyond the school. Projects are based on real-world problems that capture learners' interest. This technique develops higher order thinking as the students acquire and apply new knowledge in a problem-solving context.

D. Field trip

One of the main aims of teaching ICT in Rwanda is to apply its knowledge for development. To achieve this aim we need to show to students the relationship between classroom science lessons and applied sciences. This helps them see the link between science principles and technological applications.

To be successful, the field visit should be well prepared and well exploited after the visit:

Before the visit, the teacher and student:

- agree on aims and objectives
- gather relevant information prior to visit
- brainstorm on key questions and share responsibilities
- discuss materials needed and other logistical and administrative issues
- discuss and agree on accepted behaviours during the visit
- Visit the area before the trip if possible to familiarise yourself with the place

After the visit

When students come back from trip, the teacher should plan for follow-up. The follow-up should allow students to share experiences and relate them to the prior science knowledge. This can be done in several ways; either: Students write a report individually or in groups and give to the teacher for marking. The teacher then arranges for discussion to explain possible misconceptions and fill gaps. Or students write reports in groups and display them on the class notice board for everyone to read.

Main steps for a lesson in active learning approach

All the principles and characteristics of the active learning process highlighted above are reflected in steps of a lesson as displayed below. Generally, the lesson is divided into three main parts whereby each one is divided into smaller steps to make sure that students are involved in the learning process. Below are those main parts and their small steps:

1) Introduction

Introduction is a part where the teacher makes connection between the current and previous lesson through appropriate technique. The teacher opens short discussions to encourage students to think about the previous learning experience and connect it with the current instructional objective. The teacher reviews the prior knowledge, skills and attitudes which have a link with the new concepts to create good foundation and logical sequencings.

2) Development of the new lesson

The development of a lesson that introduces a new concept will go through the following small steps: discovery activities, presentation of student-teachers' findings, exploitation, synthesis/summary and exercises/application activities, explained below:

- **Discovery activity**

Step 1

- The teacher discusses convincingly with students to take responsibility of their learning
- He/she distributes the task/activity and gives instructions related to the tasks (working in groups, pairs, or individual to instigate collaborative learning, to discover knowledge to be learned)

Step 2

- The teacher let the students work collaboratively on the task.
- During this period the teacher refrains to intervene directly on the knowledge
- He/she then monitors how the students are progressing towards the knowledge to be learned and boost those who are still behind (but without communicating to them the knowledge).
- **Presentation of student-teachers' productions**
 - In this episode, the teacher invites representatives of groups to present the student-teachers' productions/findings.
 - After three/four or an acceptable number of presentations, the teacher decides to engage the class into exploitation of the student-teachers' productions.
- **Exploitation of student-teachers's productions**
 - The teacher asks the students to evaluate the productions: which ones are correct, incomplete or false
 - Then the teacher judges the logic of the student-teachers' products, corrects those which are false, completes those which are incomplete, and confirms

those which correct.

- **Institutionalization (summary/conclusion/ and examples)**

- The teacher summarises the learned knowledge and gives examples which illustrate the learned content.

- **Exercises/Application activities**

- Exercises of applying processes and products/objects related to learned unit/ sub-unit

- Exercises in real life contexts

- Teacher guides students to make the connection of what they learnt to real life situations. At this level, the role of teacher is to monitor the fixation of process and product/object being learned.

3) Assessment

In this step the teacher asks some questions to assess achievement of instructional objective. During assessment activity, students work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. In some cases, the teacher can end with a homework assignment.

PART II. SAMPLE LESSON PLAN

Lesson plan

School name: X

Teacher's name: X

Term	Date	Subject	Class	Unit No	Lesson No	Duration	Class size
2	X	ICT	S6	2	5 of 13	40 min	40 students
Type of Special Educational Needs to be catered for in this lesson and number of students in each category				None of students needs special educational needs			
Unit title		INTRODUCTION TO WEB DESIGNING					
Key Unit Competence:		Create a static website using HTML					

Title of the lesson	Design a static web page using html tags and hyperlinks		
Instructional objectives	After learning the lesson, students will be able to appreciate the use of different tags used to create a web page		
Plan for this Class (location: in / outside)	This class will be held in computer lab connected to internet and Students will be organize in small groups		
Learning Materials (for all learners)	Computers connected to internet, projector, ICT student text book S6.		
References	ICT student text book S6 and internet website: https://www.w3schools.com/html/html_links.asp		
Timing for each step	Teacher activities	Learner activities	Competences and cross cutting issues to be addressed + a short explanation
Introduction 5 minutes	<ul style="list-style-type: none"> The teacher facilitates students to go in their respective groups Teacher asks some questions which helps students to discover the topic of the lesson. 	<ul style="list-style-type: none"> Students respond appropriately to the questions asked by the teacher in review of the lesson. Students discuss about hyperlinks using internet. 	<ul style="list-style-type: none"> Communication Cooperation Critical thinking. <p>Gender through mixing boys and girls to do activity</p>

<p>Development of the lesson (Harmonization and summary)</p> <p>10 minutes:</p> <p>Doing activity</p> <p>5 minutes:</p> <p>Presentation</p> <p>10 minutes</p> <p>Doing application activity</p>	<ul style="list-style-type: none"> - Teacher provides activity questions to discuss in pair using internet. - Teacher guides students to do their activity - The teacher asks students to present their findings and give additional comments to the students 'work. - Teacher provides application Activity to students. - Teacher comments on work of students 	<ul style="list-style-type: none"> - In groups, using internet <p>Students discuss on:</p> <p>The process of creating, saving and running HTML page</p> <p>HTML links</p> <ul style="list-style-type: none"> - Students ask questions for clarifications while discussing in groups. - Students individually do application activity using shit of papers 	<p>Communication through presentations and discussing in groups.</p> <p>Cooperation when working together in groups</p> <p>Gender education:</p> <p>Both boys and girls should participate in doing a research and discuss about how to design a static web page using html tags and hyperlinks.</p> <p>Financial education :</p> <p>Select an effective and efficient version of HTML which will help in designing a good and efficient website.</p>
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<p>Conclusion (Assessment) 10 minutes</p>	<ul style="list-style-type: none"> - The teacher concludes the lesson by asking questions to the learners, to know the achievement of the objective. - Provides a simple quiz - To be completed by the tutor after the lesson 	<ul style="list-style-type: none"> - Students individually do application activity using shit of papers - Doing a quiz in using their draft books and pens 	<p>Critical thinking and interpersonal cooperation</p>
<p>Teacher self-evaluation</p>			

PART III. UNIT DEVELOPMENT

1.1. Key unit competence:

Create, manipulate and query an access database

1.2. Prerequisite knowledge and skills:

Students are already familiar with office programs, their menu and their tools and how to use them, they will then find it easy to use the different menu and tools found on Microsoft Office Access.

Students have also dim understanding of what a database is as they visit different websites having an underlying database. They are aware of the managements of records at their schools which can help them easily understand the database concept.

1.3. Cross-cutting issues to be addressed:

Throughout every lesson, cross cutting issues have to be addressed. Addressing cross cutting issues makes a lesson not a standalone entity but something that is related to real issues in society. Here are how cross cutting issues are addressed:

- **Standardization culture:** While learning Access, students become aware that data from programs like Excel can be imported into Access like data from Access can be exported in Excel. This requires that there be a certain level of standardization which allows that each program can read content from the other.
- **Financial Education:** Is covered when students discuss the cost implication involved in designing a new database and the financial benefits of having a database system.
- **Gender education:** students must be aware that ICT is not a subject appropriate only for girls or boys. ICT topics especially those related to database design are appropriate for both sexes not for only boys.

1.4. Guidance on the introductory activity

- The teacher organizes students in groups of five in order to do the unit's introductory activity.
- The teacher asks students to do the introductory activity in their respective groups.
- The teacher moves around to see how students are working and provides guidance where it is needed.

- The teacher invites some groups to presents their findings to the class
- The teacher asks students to evaluate the findings.
- The teacher tells students that in the coming lessons they will have complete answers.

Answer of introductory activity

- a) The tables for this new database are: REGISTRATION, PAYMENTS, MARKS, DISCIPLINE, DELIBERATION
- b) To keep information in a computer database has the following advantages:
1. No redundant of data
 2. Data Consistency and Integrity:
 3. Data Security which limits who has right to have access to data
 4. Easy access to data: data is easily accessible through different mechanisms provided by the database like queries, reports
 5. Easy recovery: Since database systems keeps t

1.5. List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Understanding database	Explain the benefits of using a data management system over Traditional File Processing System	2
2	Key terms used in database	Explain the different terms related to database management	1
3	Data type	Identify the different data types in Access and understand their use in a database	1
4	Database design steps	Explain the different database design steps and their relevancy in creating a reliable database	1
5	Creating, saving, closing and opening a database	Manipulate a database by creating, saving, opening and closing it	1
6	Creation of table relationship	Establish database table relationship by using Entity Relationship Diagram notations	2

7	Establishing table relationships in Access	Create related tables by reading the corresponding ERD	1
8	Adding data to a database (data entry)	Enter data in an Access database table in datasheet view or using created forms	2
9	Querying a database in design view	Create queries in design view to respond to data requests	2
10	Database normalization	Create an optimized database that has features a good database	1
11	Database project	Create a database system to solve a real-life problem in the school environment	2
12	End Unit assessment		2

LESSON 1: Understanding database

a) Learning objectives

Explain the benefits of using a data management system over Traditional File Processing System

b) Teaching resources:

For this lesson to be effective students and students will need to have student books and computers with internet connectivity for doing research in order to understand different database concepts.

c) Prerequisites

Students already learnt Word, Excel and PowerPoint and are therefore familiar of how information is kept by using those Word, Excel and PowerPoint files and this can help them understand the database concepts. They also encountered different applications which have databases and this may help grasp the meaning easily.

d) Learning activity:

Guidance:

This is the beginning of the whole unit on Database creation and manipulation. This lesson is preceded by an analysis of the introductory activity which is given as a homework then discussed as the new unit starts

The lesson on “Understanding database” starts by giving answers to the question in the activity 1.1

Under the guidance of the teacher, students explore how database approach came in place, what was the disadvantages of the old approach and the advantage of the new one.

The teacher gives guidance on how to do the questions in the application activity 1.1

Answers of activity 1.1

The meaning of the term database can be got from the student's book. Students then give examples of databases that are used in their school environment or society.

e) Application activity 1.1

Answers :

Students may answer question 1, 2 and 3 basing on the knowledge they have got from this lesson or simply by reading the content of the student's book in the corresponding section

LESSON 2: Key terms used in Database

a) Learning objectives

Explain the different terms related to database management

b) Teaching resources

For the effectiveness of the lesson, it is necessary to have student's book and computers with internet connectivity to facilitate research which is very necessary for understanding the database key terms

c) Prerequisites

Students have some understanding on database got from the first lesson of this unit and can apply it in learning easily this lesson.

d) Learning activity:

Guidance: The lesson starts with a quick presentation by students who have done a research as instructed by the activity 1.2

Under the guidance of the teacher, students explain the different terms found in the database world

The teacher displays an access tables and students identify its different parts (rows, columns) and their other nominations

The teacher gives guidance on how to do application activity 1.2 and group students to do a research on NoSQL.

Answers of activity 1.2

Explanation of the terms research can be got in the student book. Students do research to find advanced explanations. They also find other terms and explain them. Some of these terms can be found in the student's book in the section on "Key terms used in database"

e) Application Activity 1.2

Answers :

Answers for the application activity 1.2 are found in the student book. For answers that cannot be immediately found the teacher help students refine the answers or search for them on the internet.

LESSON 3: Data type

a) Learning objectives

Identify the different data types in Access and understand their use in a database

b) Teaching resources:

Students and the teacher will need to have the student book and the internet connectivity for additional research. They also need to have computers with Microsoft Office Access to show which data types are catered for in this program and a projector.

c) Prerequisites

As students learnt Excel in Year One and Two, they know the different Excel number formats which are General, Number, Currency, Date, Time, Text, etc. Student can then build on this knowledge in order to understand data types in Excel and why they are a necessity.

d) Learning activity:

Guidance:

The teacher presents the image in the activity 1.3 and asks the problems associated with it to which students respond. This is going to serve as a motivational part of the lesson.

Under the guidance of the teacher, students discover the importance of defining data types in Access

The teacher open Access and demonstrates the different data types available and guided by the teacher students brainstorm their uses.

The teacher briefly explains to students the other languages that have specific data types

Answers of activity 1.3

- a) The error messages are due to the wrong data type that Karenzi is attempting to enter in the table
 - b) He has to enter the right data types or modify the table acceptable data types so as to be able to enter the data he has on the paper
 - c) The cause can be that this column is set to receive numbers instead of text
- e) Application activity 1.3**

Answers :

Column name	data	Data type
Idnumber	25678/09	Auto Number
FirstName	Mukawera Gasana	Short text
LastName	Athanasia	Short text
Address	Ruhango District	Short text
Sex	F	Yes/No
DateofBirth	16/09/2008	Date/Time

LESSON 4: Database design steps

a) Learning objectives

Explain the different database design steps and their relevancy in creating a reliable database

b) Teaching resources:

Resources needed for this lesson are: student's book and computers with internet connectivity for doing additional research.

c) Prerequisites

Students are used to delivering lessons in primary classes, they know what it requires them from to have a lesson ready for delivery; they can therefore apply this reasoning in this new lesson.

d) Learning activity:

Guidance:

- Start the lesson by making group of 2students
- In groups, students start doing the activity 1.4
- In groups students discuss the scenario in activity 1.4, present their findings and the whole class discuss on the findings.
- With the guidance of the teacher the class discuss the steps for database

design and brainstorm what is done in each step

- As students have now seen the steps of database design they evaluate their findings that they presented at the beginning of the lesson
- The teacher gives guidance on how to do the application activity 1.4

Answers of activity 1.4

1. Students discuss the different steps to go through in order to solve the problem presented in the scenario. This was done at the beginning of the lesson but as the lesson ends and they have more knowledge they try to improve what they had found. Steps to go through in designing a database are available in student book.
2. Students discuss the benefits for the school when teachers start using the new computerized database.

e) Application Activity 1.4

Answers :

The questions of activity 1.4 can be answered by reading the content available in the student book.

LESSON 5: Creating, saving, closing and opening a database

a) Learning objectives

Manipulate a database by creating, saving, opening and closing it

b) Teaching resources

This lesson will require the existence of these materials: one computer for each student in the computer laboratory with Microsoft Office 2013 installed, projector for demonstrating examples, student book and internet connectivity for doing researches.

c) Prerequisites

Students already know how to open, save, and close Word, Excel and PowerPoint documents as they learned the related units in Ordinary level and in Year One & Year Two in TTC. As this is much the same in Access, they will find it easy to apply the same in this new lesson.

d) Learning activity:

Guidance:

- Under the guidance of the teacher, individually, students read and answer questions in the activity 1.5
- The teacher opens Access 2013 and try to show the different objects in it and explains their roles in an Access database
- The teacher demonstrates how to create a database in Design, how to open and close a database and students follow suit.

Answers of activity 1.5

1. Using MS Access 2013, students' teachers create and name respectively: Customer, Employee and Product tables.
2. Students teacher identifies a primary key for each table
3. student discusses the importance of the primary key in each table. (all additional information is provided in student book)

e) Application Activity 1.5

Answers :

1. Using the steps of database creation as they have seen them in the lesson, students create an Access database and save it on the desktop
2. In the created database "Marks", students create two tables for "SET marks for P2" and "SET marks for P3". Choose the right primary key and define the right data type.
3. A primary key is a special relational database table column (or combination of columns) designated to uniquely identify all table records. A primary key's main features are: It must contain a unique value for each row of data. It cannot contain null values

LESSON 6: Creation of table relationship

a) Learning objectives

Establish database table relationship by using Entity Relationship Diagram notations

b) Teaching resources:

Teacher and students will need computers in the computer lab with Office 2013 installed, projector for demonstrating examples to the class, student's book and internet connectivity for doing more research.

c) Prerequisites

Students have seen tables in Word and Excel. They know that tables may be related by having columns that are much alike or completely the same. This may be built on in making them understand relationships in Access and why it is necessary.

d) Learning activity:

Guidance:

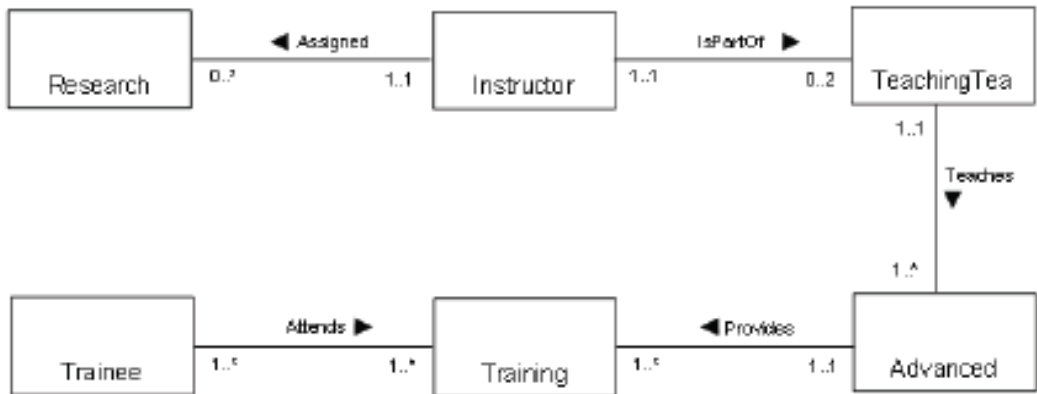
- This lesson is started by grouping students and making them search for the importance of establishing relationships in database tables.
- For each kind of table relationship, the teacher narrates a story on which he/she then asks questions in order to make students discover it
- By questions and answers, students give characteristics of each table relationship
- The teacher shows the different types of diagrams used in an Entity Relationship Diagram
- The teacher gives scenario of tables for which students create ERD using the Chen notation
- The teacher gives guidance on how to do application activity 1.6 in which students are going to convert the Chen ERD into the Crow's notation version

Answers of activity 1.6

- 1) A relationship, in the context of databases, is a situation that exists between two relational database tables when one table has a foreign key that references the primary key of the other table. Relationships allow relational databases to split and store data in different tables, while linking disparate data items.
- 2) An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database.

e) Application Activity 1.6

Answers :



LESSON 7: Establishing table relationships in Access

a) Learning objectives

Create related tables by reading the corresponding ERD

b) Teaching resources:

This is a practice dominated lesson. For this reason, there will be a need of: computers in the computer lab with Office 2013 installed, projector for demonstrating examples to the class, student's book and internet connectivity for doing more research.

c) Prerequisites

Students already know the different types of database table relationships and can establish an Entity Relationship Diagram. Basing on the basic knowledge in Access they can built tables, create primary keys and foreign keys to establish relationships among them.

d) Learning activity:

Guidance:

- Teacher organizes student in groups in order to do activity 1.7
- Students elect the group leader and secretary.
- Teacher walks around and sees if students are doing activity in their respective groups
- Teacher asks the student to work independently for some while
- Teacher walks around and sees if students are doing activity in their respective groups

- Student shows the Facebook to the rest of students and teacher helps them to understand Facebook and Facebook usage.

Answers of activity 1.7

Answer of the activity 1.7 are available in the student book. Students redo it but they make sure they understand the answers they give.

e) Application activity 1.7

Answers :

- 1) A calculated data type in a table facilitates the task as it removes the option of entering data in the column having that data type. It also removes the dangers of entering wrong data as Excel does the data entry for the user.
- 2) students do a research and discover how to use the different elements in an expression builder. The elements of an expression builder are: tables (with their columns), functions, constants and operators.
- 3) Using Ms Access, student creates a database and tables inside that database

LESSON 8: Adding Data to a database (data entry)

a) Learning objectives

Enter data in an Access database table in data sheet view or using created forms

b) Teaching resources:

Students will need computers in the computer lab with Office 2013 installed, projector for demonstrating examples to the class, student's book and internet connectivity for doing more research. There will also be a need of data on hard copy or excel data to be imported in Access.

c) Prerequisites

Students are familiar with entering data in other programs like word tables and Excel. They can apply their skills in entering data in an Access database.

d) Learning activity:

Guidance:

- The lesson starts with students doing the activity 1.8
- With the guidance of the teacher, students explain the terms like front end and backend
- Under the guidance of the teacher, students open the library database in datasheet view and enter data from a hard copy

- Under the guidance of the teacher, students create forms that they are going to use in entering data in the library database
- The teacher shows how to design a beautiful form for a database with logo, an interface for a database application
- The teacher gives guidance on how to do application activity 1.8

Answers of activity 1.8

- 1) Data entry is the process of inputting data or information into the computer using devices such as a keyboard, scanner, disk, and voice.
- 2) There are several problems involved when it comes to manual data entry, which includes cost, human errors, time constraints, misinterpretation.
- 3) Answers for this question are available in student book.

e) Application activity 1.8

Answers :

1. Students create a student registration form. All steps to create such form are available in student book.

LESSON 9: Querying a database in design view

a) Learning objectives

Create queries in design view to respond to data requests

b) Teaching resources:

For this lesson these materials will be needed: Computers with Microsoft Office 2013 installed, student book, projector and internet connectivity for conducting research

- Computers in the computer lab with Microsoft Office 2013 installed
- Senior 6 student's book
- Internet connectivity for researching how queries are designed
- Projector for demonstrations to students

c) Prerequisites

Students are familiar with searching for specific data in Excel by filtering, they can then apply it in querying an Access database.

d) Learning activity:

Guidance:

- Students brainstorm the meaning of queries and the role they play in a database
- Under the guidance of the teacher, students recall the tables that compose the school library database, the columns in those tables, the data types, the primary and foreign keys.
- The teacher demonstrates the steps to follow in order to build a query in design view
- The teacher creates a design view query to run on one table, students follow suit
- The teacher gives quick exercises of queries involving one table and students create and run those queries
- The teacher presents to students the scenario where they want to get data that can be got from more than one table and asks questions on how to get the result
- The teacher demonstrates how to create and run queries involving many tables
- Quick exercises to create queries on many tables are given and students create queries and run them
- As students do exercises the teacher moves in the class to help those that may be having difficulties
- The teacher gives guidance on how to do application activity 1.9

Answers of activity 1.9

1. a) students create the table which can keep the given data
b) Using MS Access, students display Book title, Author, Publication Date, and value for the books in the category of science.
c) Using MS Access, students display books which have value above 40,000

e) Application Activity 1.9

Answers :

a) To display male students, use the query in design view on the left:

The query in design view:					The output of the query:				
Field:	StdID	FirstName	LastName	SEX	StdID	FirstName	LastName	SEX	
Table:	STUDENTS	STUDENTS	STUDENTS	STUDENTS	STU00002	Karwana	Jean	Male	
Sort:					STU00004	Gatera	Dieudonne	Male	
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	STU00005	Muryangendo	Jean	Male	
Criteria:				'male'	STU00007	Musanganyima	Gaspard	Male	
or:					STU00008	Ndayishimiye	Jean	Male	
					STU00009	Nzeyimana, Per		Male	
					STU00010	Muriyabugingo	Jean	Male	

b) To display students whose name, start with letter “U” use the following query:

Query in design view to display names starting with letter U:					Sample output:				
Field:	StdID	FirstName	LastName	SEX	StdID	FirstName	LastName	SEX	
Table:	STUDENTS	STUDENTS	STUDENTS	STUDENTS	STU00001	Uwera	Esperance	Female	
Sort:					STU00006	Uwoniringiye	Judith	Female	
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	STU00042	Uwayezu	J.	Male	
Criteria:		Like "U*"			STU00062	Uwihirwe	Jean	Male	
or:					STU00075	Uwizeye	Etienne	Male	
					STU00111	UBONABENSHI	JMV	Male	
					STU00159	UWANYIRIGIRA	JACQUELINE	Female	
					STU00185	Umurungi	Régine	Female	
					STU00188	Uwamuregey	Thamar	Male	
					STU00200	Uwiyaremye	Jean	Male	
					STU00203	Uwitonze	Philbert	Male	

a) Books which are in the Mathematics category can be selected using the query below:

Query for displaying Mathematics books:					The sample output is here displayed:				
Field:	BkNumber	BkCategory	BkTitle	Author	BkNumber	BkCategory	BkTitle	Author	
Table:	BOOKS	BOOKS	BOOKS	BOOKS	00008	Mathematic	Mathematics made	MUHAYIMUNU	
Sort:					00011	Mathematic	Mathematics made	NIZEYIMANA, E	
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00018	Mathematic	Mathematics made	IRIBAGIZA, N	
Criteria:		'mathematics'			00021	Mathematic	Mathematics made	NYONSABA, Jo	
or:					00026	Mathematic	Mathematics made	SIDOMANA, Syl	
					00031	Mathematic	Mathematics made	IRISHAKIYE, B	
					00036	Mathematic	Mathematics made	INGABIRE, Fran	
					00041	Mathematic	Mathematics made	MUKAMANGI, P	
					00046	Mathematic	Mathematics made	NYONZIMA, OI	
					00051	Mathematic	Mathematics made	ITABISHAKA, J	
					00056	Mathematic	Mathematics made	HAGURIMANA,	
					00061	Mathematic	Mathematics made	KAMPIRE, Carli	
					00066	Mathematic	Mathematics made	INGABIRE, Mar	

b) Students who study in MPC option in 2010 can be displayed by using two tables

Sample query:

The screenshot shows a query window with two tables: STUDENTS and COMBINATIONS. The STUDENTS table has fields: StuID, FirstName, LastName, SEX. The COMBINATIONS table has fields: Combination, StuID, SchoolYear, YearOfStudy. A join is established between the two tables. The criteria for the query are set to SchoolYear = 2010.

Field	FirstName	LastName	Combination	SchoolYear
Table:	STUDENTS	STUDENTS	COMBINATIONS	COMBINATIONS
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:			"MPC"	"2010"
or:				

Sample output of the query:

The screenshot shows a query result grid with the following data:

FirstNam	LastName	Combination	SchoolY
Jean Baptis	BIGIRIMPAN	MPC	2010

LESSON 10: Database normalization

a) Learning objectives

Create an optimized database that has features of a good database

b) Teaching resources:

For teaching and learning this lesson there is a need of: projector for display demonstrations, student book, a computer to connect to the projector and internet connectivity for doing additional research.

c) Prerequisites

This lesson is going to build on previous lessons in this unit. Students know that a table must have a primary key and sometimes a foreign key. They have seen long tables (not normalized) and have realized that they present problems though they don't know which and how to sort them out.

d) Learning activity:

Guidance:

- Student form groups and elect the group leader and start doing the activity 1.10
- The teacher display using the projector the a very long table which has all the problems presented by database which is not normalized
- Under the guidance of the teacher students brainstorm the problems that such a table in a database may cause
- Students brainstorm what can be done in order to improve the presented table
- After explaining how a table is converted in 1NF students convert the table in this form
- Students identify the repetitive parts found in the converted table and suggest the tables that can be derived from the big one
- Under the guidance of the teacher the table is converted to the 2NF

- Under the guidance of the teacherstudents identify the transitive dependency in the tables (if any) and convert them to the 3NF
- The teacher gives guidance on how to do application activity 1.10.

Answers of activity 1.10

1. The ORDER table allows many entries for one customer as one person may buy many items and he/she can do this many different days. For example, the table ORDERS may contain these rows:

Customer Name	Address	Telephone Number	Credit Limit	Item Ordered	Quantity	Price	Date
Uwera	KG 301 St	078182121	500000	Shoes	2	80000	1/11/19
Uwera	KG 301 St	078182121	500000	Shirt	1	30000	1/11/19
Uwera	KG 301 St	078182121	500000	Blanket	1	30000	1/11/19
Uwera	KG 301 St	078182121	500000	Pen	5	2000	1/11/19

2. As it is obvious, the above table has a lot of repetitive information (redundancy) it is good to break up this table into many tables in order to eliminate the problems that unnormalized database presents.

e) Application Activity 1.10

Answers :

- 1) It is very necessary to have a normalized database because when the database is not normalized it presents update, deletion and update anomalies. This kind of database also has redundancy problems.
- 2) This table can be converted in the 3NF in order to have a normalized database:

- **Conversion of the table in the 1NF:**

CustNo	CustName	District	Province	ProdId	Description
005	UWIMANA Yvonne	Gisagara	South	1	HP Laser Jet Printer
005	UWIMANA Yvonne	Gisagara	South	2	Hair Trimmer
005	UWIMANA Yvonne	Gisagara	South	3	HP ProBook4530s
008	KAGABO Peter	Rusizi	West	2	Hair Trimmer

008	KAGABO Peter	Rusizi	West	7	POSITIVO BGH Laptop
014	RUKUNDO Paul	Nyarugenge	Kigali	5	Lenovo L430 Laptop
002	MUGABO Tom	Gisagara	South	7	POSITIVO BGH Laptop
002	MUGABO Tom	Gisagara	South	1	HP Laser Jet Printer
002	MUGABO Tom	Gisagara	South	2	Hair Trimmer

- **Conversion of the table to the 2NF:**

CUSTOMER table:

CustNo	CustName	District	Province
005	UWIMANA Yvonne	Gisagara	South
008	KAGABO Peter	Rusizi	West
002	MUGABO Tom	Gisagara	South

PRODUCTS table:

ProdId	Description
1	HP Laser Jet Printer
2	Hair Trimmer
3	HP ProBook4530s
7	POSITIVO BGH Laptop
5	Lenovo L430 Laptop

After breaking the original table there is no more redundancy in the database/table but the original table had 9 rows while among the two the one with more rows has 5 rows which means that some data has been lost yet normalization has to be LOSSLESS. A third table has to be created to avoid that loss of data. The table can be called ORDERS

OrderID	CustomerID	ProdId
ORD01	005	1
ORD0	005	2
ORD0	005	3
ORD0	008	2
ORD0	008	7
ORD0	014	5
ORD0	002	7
ORD0	002	1
ORD0	002	2

LESSON 11: Database project

a) Learning objectives

Create a database system to solve a real-life problem in the school environment.

b) Teaching resources:

For easy teaching and learning of this lesson there will be a need of:

Papers or any notebook to collect investigation information, student book, internet connectivity to carry out researches, computers with Office 2013 installed and a projector to present their projects

c) Prerequisites

Students have everything they need to learn this lesson and make database projects; this lesson is a kind of put-it-in-practice stage where they are going to apply all they know on database management using Access. Students have also done school attachment and know the business process of schools; they can apply this in building school databases if this is the project they choose.

d) Learning Activity:

Guidance:

- The teacher introduces the lesson by stating the objectives of the lesson
- With help of teacher, students form groups
- Teacher explains students' which kinds of projects they are going to built
- Students give ideas on what they expect to be able to do by the end of the lesson
- Under the guidance of the teacher, students explain what is done in the investigation step
- The teacher explains the different techniques that are used in investigation
- Students work on a project for Loan Management system and do practice on the investigation step
- The teacher explains the analysis step learners do their practice using the Loan management system
- For the other steps (logical design and implementation), under the guidance of the teacher, students explain what is done and the output got at the end of those steps.
- Students practice data entry in the Loan Management System they have built or export data from other applications like Excel.

Working on the database project:

- The teacher instructs students to choose the database projects they are going to work on in groups. The role of each group member should be clear in order to avoid that there are some that are inactive. The projects should be those that allow students to work around their school environment.
- As a project requires more work, a bigger part of this project will be done beyond ordinary teaching and learning hours. The duration of the project will not go beyond one month after the end of the unit

Presenting the project:

- Students prepare the room in which their projects are going to be presented.
- If the room is big enough allow students from other classes to participate or even teachers for other subjects
- let students present their projects

Answers of activity 1.11

1. The steps to go through in order to build this database are shown in the student's book. Those steps are: Investigation, Analysis, Logical design,

Implementation and data entry. Explanations on each step are also available in the student's book.

2. students build the database system to manage the company data. This database may have the following tables: CARS, CLIENTS, PAYMENTS, PRICING, CARSTATUS, etc.

e) Application Activity 1.11

Answers :

Students create a Gate Management System. They make it have forms as the main interface through which users interact with the system and make it look like a real system

1.6. Summary of the unit

This unit deals with database creation and manipulation which focuses on creating a database in Access. Students start by learning the common concepts in Database Management System which will help them create a fine database that meets all the criteria of a good management system.

The unit also shows how to create an Access database using the design view method. The tables in the database are created and relationship among them created. Students finally learn how to query the database they have created.

The teaching and learning of this unit will be judged successful if students are capable of constructing compelling database projects which aim at solving real life problem in their environment. This project will be presented and evaluated by the teacher and colleague students.

The unit does not give all the details and only one example is given where examples are needed, as a teacher you will provide additional examples if it is obvious that the one provided does not completely clear the matter.

1.7. Additional information

For teaching the unit "Database Creation and Manipulation" Microsoft Office Access 2013 is used. This goes in line with other office programs which are taught from Year One to Year Two. It is not advised to use advanced office program and is forbidden to use older versions than Office 2013. When this is done, the accompanying student book will be of less help

Since learners are already familiar with computers and learnt Office programs from Senior One, it was not necessary to give all the details. For example, it was judged not necessary to explain how to copy and paste text, how to write using the

keyboard, etc.

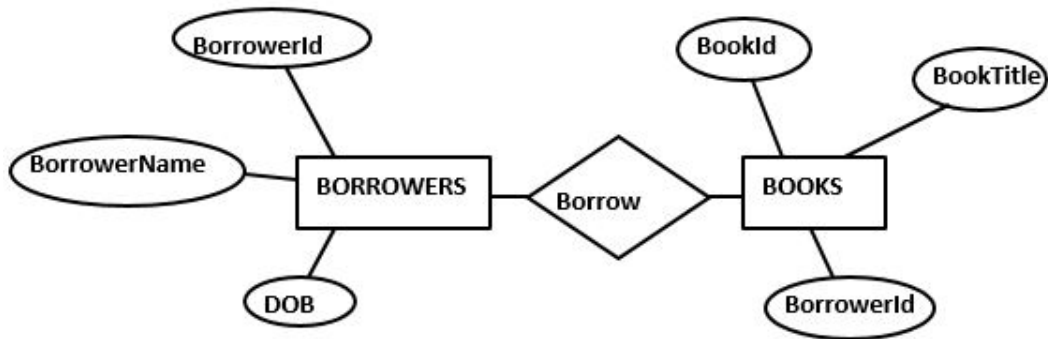
Most, if not all the lessons in this unit are taught using a computer and a projector so that the teacher demonstrates to students' examples that they will follow in going exercises.

1.8. End Unit assessment answers

Question 1. Answer:

- i) BorrowerId, BookId are unique and stable and can serve as primary keys of their respective tables
- ii) BorrowerId is the foreign key
- iii) BOOKS candidate keys are: BookId, BookTitle BORROWERS candidate keys are: BorrowerId, BorrowerName-Assume that there is no borrowers having same name
- iv) Relationship between BORROWERS and BOOKS is below:

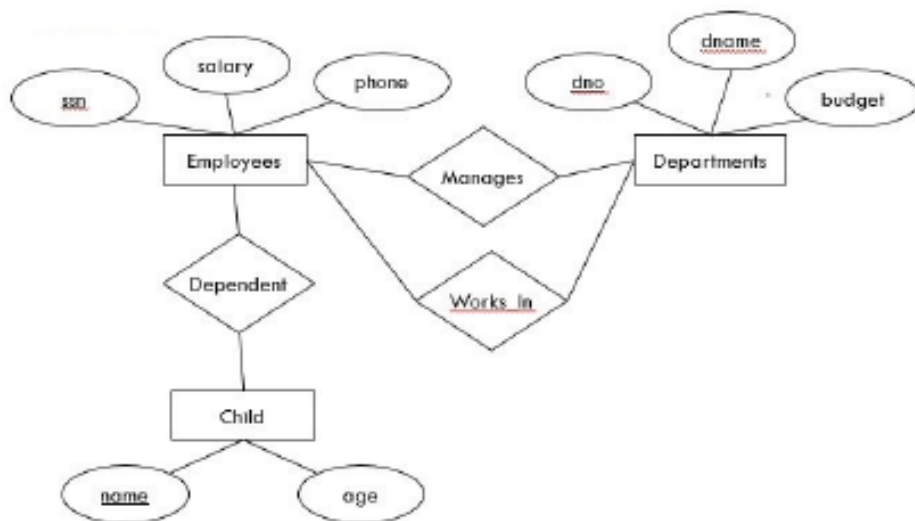
ER Diagram



- v) Yes, table BOOKS exhibit referential integrity. Because BorrowerId appears in BOOKS entity is foreign key from reference table BORROWERS.

Question 2 answer:

The ER diagram below can be drawn from the presented scenario:



Question 3. Answer:

- a) The table is not well structured, un-normalized containing redundant data. By using a bottom-up approach, are we analyzing the given table for anomalies:
- First observation, we see multiple values in an appointment column and this violate the 1NF.
 - By assuming the staffNo and patientNo as candidate keys, there are many anomalies exist.

b) The anomalies are:

Insertion anomalies:

To insert a new patient particular that makes an appointment with the designated Doctor, we need to enter the correct detail for the staff. For example, to insert the details of new patient in patientNo, patientName and an appointment, we must enter the correct details of the doctor (staffNo, dentistName) so that the patient details are consistent with values for the designated Doctor for example, S1011.

To enter new patient data that doesn't have Doctor to be assigned we can't insert NULL values for the primary key.

Deletion anomalies:

If we want to delete a patient named Umwali Grace for example, two records need to be deleted as in row 3 and 4.

This anomaly also obvious when we want to delete the dentistName, multiple records needs to be deleted to maintain the data integrity.

When we delete a Dentist record, for example Rugwiro Yvan, the details about his patients also lost from the database.

Modification anomalies:

With redundant data, when we want to change the value of one columns of a particular Dentist, for example the dentistName, we must update all the Dentist records that assigned to the particular patient otherwise the database will become inconsistent. We also need to modify the appointment schedules because different Dentist has different schedules.

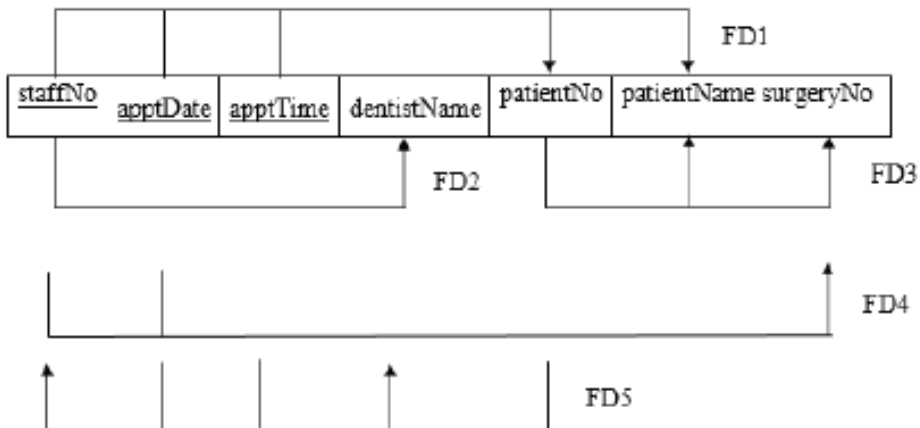
- b) Describe and illustrate the process of normalizing the table shown in Figure 1 to 3NF. State any assumptions you make about the data shown in this table.

Assumptions made include that a patient is registered at only one surgery and he/she may have more than one appointment on a given day. All the schedules have been fixed for the whole days and week.

c) Normalization of the database (table)

In the 1NF we remove all the repeating groups (appointment), assigning new column (apptDate and apptTime) and assigned primary keys (candidate keys). Then we figure out the functional dependencies (FDs). By using dependency diagram, we represent the table as shown below. (NF – stand for Normal Form)

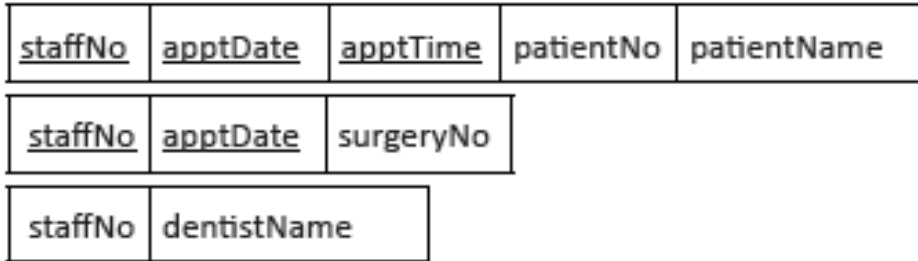
Note: How to find the FDs is subjective. However, the rule is, it must reflect the real word situation.



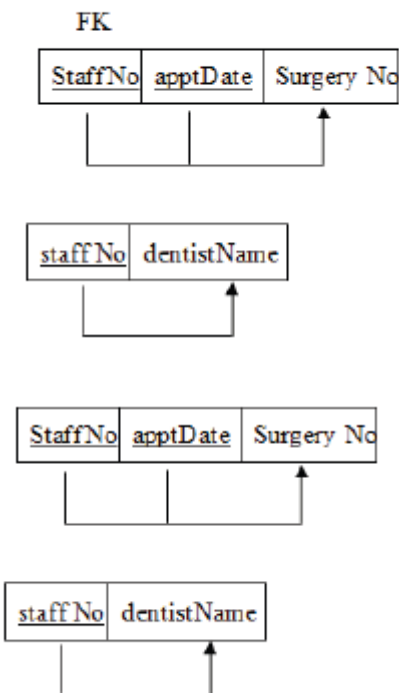
FD1 is already in 2NF. In this case, we can see that FD2 (just depend on staffNo) and FD4 (just depend on staffNo and apptDate) violate the 2NF. These two NFs are partially dependent on the candidate keys not the whole keys. FD2 can stand on its own by depending on the staffNo and meanwhile FD4 also can stand on its own by depending on the staffNo.

The FD3 violates the 3NF showing the transitive dependency where surgeryNo and patientName depend on patientNo while patientNo depend on the staffNo that is the non-key is depending on another non-key.

The 2NF, it is already in 1NF and there is no **partial dependency**. So we need to remove the FD2 and FD4 by splitting into new tables and at the same time creating foreign keys. The new tables that are in 2NF are shown below.



Finally, in 3NF we must remove the transitive dependency. In this case we remove the FD3 by splitting into a new table. The transitive dependency left is the patientName that depend on the patientNo, so we split this into new table while creating a Foreign Key.



Let re-arrange and giving names to the tables

<u>staffNo</u>	dentistName
----------------	-------------

Dentist(staffNo, dentistName)

FK

<u>staffNo</u>	<u>apptDate</u>	surgeryNo
----------------	-----------------	-----------

Surgery(staffNo, apptDate, surgeryNo)

patientNo	patientName
-----------	-------------

Patient (patientNo, patientName)

staffNo	apptDate	apptTime	patientNo
---------	----------	----------	-----------

FK

1.9. Additional Activity

1.9.1. Remedial Activity

- 1) State database design steps.
- 2) Differentiate entity and relationship.
- 3) Define the following terms:
 - a) Column
 - b) Record
 - c) Null
 - d) Degree
- 4) Suppose a student called UWIMANA work on his personal computer with Microsoft Office 2013 installed on it. She has created a database named SCHOOL using Microsoft Office Access 2013. This database contains three Access objects named Student, AllStudentsQuery, and StudentAddress. She wants to view these objects in the navigation pane. Which of the following options will you choose to accomplish the task?
 - a) All Access Objects
 - b) Navigate to Category
 - c) Filter By Group
 - d) Custom

1.9.2. Consolidation activity

- 1) Based on the cardinality, explain the different types of relationships that can exist between entities.
- 2) What is the kind of relationship exist between these relations:

Husband to wife, Car and steering wheel, Student to degree, Child to parent, Player to team, Student to course

1.9.3. Extended activity and answers

- 1) Which of the following data types is more commonly called Boolean?

- a) Yes/No
- b) Date/Time
- c) Yes/No

- 2) Consider the following table and answer the corresponding questions

EMPLOYEE							
EmpId	FullName	Designation	Salary	DoH	DoB	Country	City
101	KAREKEZI Ange	Accountant	240000	3/23/2003	1/13/1980	Rwanda	Huye
102	GANZA Kevin	Head-IT	320000	12/2/2010	7/22/1987	Uganda	Kampala
103	MUTONI Rehms	Customer Care	200000	6/24/2009	2/24/1983	Burundi	Bujumbura
105	NKUSI Anicet	Marketing Officer	310000	11/8/2006	3/3/1984	Burundi	Bujumbura

108	KARENZI Abdul	CEO	560000	12/29/2004	1/19/1982	Rwanda	KIGALI
-----	---------------	-----	--------	------------	-----------	--------	--------

- i) Identify the composite attribute and give reason
- ii) Identify the primary key
- iii) Which attribute could have a NULL value? Why?

- 3) The following database stores information about a bank, its customers and their loans.

LOAN			
LoanNumber	LoanType	BankBranch	Amount
C100001	Consumer loan	Musanze	1,000,000
AF100001	Asset Finance loan	Rubavu	54,000,000
MB120001	Microbusiness loan	Huye	3,000,000
AF100002	Asset Finance loan	Huye	124,000,000
MB120011	Microbusiness loan	Ngoma	800,000
MB120031	Microbusiness loan	Nyabihu	110,000
C100002	Consumer loan	Musanze	290,000

CUSTOMER			
CustomerID	CustomerName	LoanNumber	Address
10002	KAYIHURA	C100001	Musanze
10003	KAMALI	AF100001	Kicukiro
10004	UWAMALIYA	MB120001	Huye
10006	KUBWIMANA	AF100002	Ngoma
11006	MUKAMUSONI	MB120011	Rubavu
12006	AYINKAMIYE	C100002	Kicukiro
11016	MUKAMANA	MB120031	Musanze

Using queries:

- i) Find the names and address of all customers who have a loan from Musanze branch. ii) Find and show all customers who live in the same district as KAMALI.
- ii) Find and show customer id, names, Address, loan type and number of customers who have loan type of “Asset Finance loan”
- iii) What will be displayed by the following query grid:

Field:	CustomerID	CustomerName	Address	BankBranch	Amount
Table:	CUSTOMER	CUSTOMER	CUSTOMER	LOAN	LOAN
Sort:					
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:					< 3000000
or:					

2.1. Key unit competence:

Create static websites using HTML

2.2. Prerequisite knowledge and skills:

Students should have knowledge and skills related to Internet concept, Search engines learnt in Senior 1, Unit 8: Network and internet fundamentals; URL and its parts (protocol, host name, domain name, sub domain) and Search on the internet learnt in Senior 4, Unit 3: Social media and Online Services learnt in Senior 5.

2.3. Cross-cutting issues to be addressed:

Throughout every lesson, cross cutting issues must be addressed. Addressing cross cutting issues makes a lesson not to be an isolated entity but relate the lesson with the issues in real world. Here below are some cross-cutting issues to be addressed:

Inclusive Education: All students (those with and with no disabilities) are involved in the same class during teaching and learning process.

Gender education: To be covered when both (girls and boys) are involved in all learning and application Activity in a class.

Financial Education: Students must be aware of cost related to website design and implementation while choosing web server to host a web site.

Peace and value education: Students must be aware of internet-based crimes like hacking and prevent accessing people's data without permission committed using computer on different websites. They must also use the photo of others with their permissions, if not this can cause conflict.

Standardization culture: Students must have the culture of not taking from and keeping pictures on their website that are against Rwandan culture.

2.4 Guidance on the introductory activity

- This activity take place in the computer lab (where students can access the Internet) and each student must have a computer connected to the Internet where it is possible.
- The teacher instructs students to go to page where the introductory activity is in the textbook.

- The teacher organizes students into groups.
- Teacher lets students discuss about the photo observed
- The teacher asks students to do the introductory activity in their respective groups.
- Teacher lets the students work independently on the activity.
- The teacher moves around to see how students are working and provides guidance to needy groups
- The teacher invites representatives of groups to presents their findings
- The teacher asks students to evaluate findings.
- The teacher tells the students that in the fourteen coming lessons they will have complete answers.

Answer of introductory activity

1. Students observe the figure in their book and answers vary because they will respond according their experience. Students are browsing the Internet in the school computer lab or in cybercafé.
2. Students may give various names such as: www.umuravahighschool.ac.rw, www.umuravaschool.ac.rw
3. In order to delete information on the website it depends on your user privilege if you are an administrator you will be able to delete the content because you have full privilege (Read, delete, update and other) and if you are a user (Naïve User) you cannot delete the anything from the website. Note that the content cannot be deleted in the normal way by writing the website address in the browser.
4. Advantage of a website
 - Reaching a wider audience
 - Easy access to business information
 - Publicity & advertising
5. Disadvantage of a website
 - Crashes & uptime
 - Difficultly reaching the right people
 - Spam
 - Here are the five elements to web design: content, usability, aesthetics, visibility, interaction

2.5. List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Understanding of basic concepts	Explain the difference between website, web page, web application	1
2	Introduction and evolution of HTML	Explain what is HTML and its evolution.	1
3	HTML tags and syntax	Explain HTML tag and syntax	1
4	HTML syntax and html page structure	Use HTML tags to create a static web page	1
5	Design a static web page using HTML tags and hyperlinks	Appreciate the use of different tags used to create a web page	1
6	Tags that identify and name documents	Identify and describe tags that identify and name documents	1
7	HTML lists: ordered and unordered list	Appreciate the use of and html tags which create ordered and unordered list pages.	2
8	HTML lists: definition and nested lists	Appreciate the use of <dl> , and html tags which create definition and nested lists web pages	1
9	HTML frame and table tags	Identify and describe HTML tags that create frames and tables.	2
10	HTML forms	Identify and describe different form elements that create a form page.	2
11	Particularities of HTML 5	Explain specifications of HTML5	1

12	Creation of links	Appreciate the use of <a> tag that creates an hyperlink	1
13	Back end vs Front end	Explain what is Front end and Back end in website design and development	1
14	End Unit assessment		2

LESSON 1: Understanding of basic concepts

a. Learning objectives

Explain the difference between website, web page, web application

b. Teaching resources:

Computer lab, internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with using different search engines and internet programs like web browsers. As they learnt Unit 4 in Senior 4 on; they can therefore apply the same reasoning in coming lessons.

d. Learning activity:

Guidance on activity 2.1

- Teacher organizes Students in groups in order to do activity.
- Students elect the group leader and secretary.
- Teacher lets the students in groups work independently on the activity.
- Teacher walks around and sees if students are doing activity in their respective groups.
- Students react on the finding/ answers from other groups.
- Teacher corrects false answers and continue the lesson

Answers of activity 2.1

1. Find the answer in student text book, first lesson (Definitions of basic concepts)
2. For the difference between static and dynamic web pages refer to student book, first lesson (understanding of basic concepts)
3. Advantages of a static web page and dynamic web page

Advantages of a static website

- **Saves Time:** Development of static websites saves time, because static websites are easy to develop.
- **Money saving approach:** Static websites are money saving, because such websites are cheaper to develop as compared to dynamic websites.
- **Hosting:** Static websites are easier to host, because static websites have fixed data.
- **Indexing:** Search engines such as Google, Bing etc., can easily index a static website.
- **Fast Transfer:** Static websites can be quickly transferred from server to client without much processing time.

Advantages of a Dynamic Website

- **Simple to update:** Dynamic websites are simpler to update. You don't need expert knowledge to make changes to a dynamic website.
- **User-focused design:** Dynamic websites are built by keeping users in minds. Users can make preferred changes to such websites.
- **Highly responsive:** Dynamic websites can be quickly updated to become responsive to different screen sizes.
- **Highly functional:** Dynamic websites are highly functional. Users can make many changes to dynamic websites.
- **SEO (Search Engine Optimization) friendly Design:** Dynamic websites are SEO-friendly.

e. Application activity 2.1

Answers :

By guidance of the teacher, students answer the question of application activity 2.1

1. Website and web application characteristics refers to student textbook.
2. Definition of web application (refers to textbook)
Example: Irembo application
3. Web application is more advantageous comparing to website.
Web application involves application program which performs various operation.
4. Difference between static web pages and dynamic page refers to student text book
5. It is easier to update dynamic web site comparing to static website because

it is convenient for dynamic website to use a CMS (content Management System) web interface for managing content which will allow you to make changes easily.

6. It is very cheap to host static website in comparison with dynamic website as it does not require a lot of parts and more maintenance.

LESSON 2: Introduction and evolution of HTML

a. Learning objectives

Explain what is HTML and its evolution.

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students have already knowledge and skills about URL and its parts (protocol, host name, domain name, sub domain and search on the internet learnt in Senior 4, Unit 4: Searching the internet. They have also knowledge about website, web page, web application and static web page learnt in lesson 2.1.

d. Learning activity:

Guidance The teacher instructs students to go to page where the activity 2.3 is in the textbook.

- The teacher organizes students into groups.
- Teacher let students discuss questions of activity.
- The teacher moves around to see how students are working and provides guidance to needy groups
- Teacher invites 2 or 3 group representatives to present their findings to the rest of class.
- Teacher reacts on answers given by students.
- Based on the answers from students, teacher introduces the lesson.

Answers of activity 2.2

1. a. WWW stands for World Wide Web
b. HTML stands for Hypertext Markup Language
2. The World Wide Web is an internet-based system or platform that allows hypertext documents to be interconnected by hyperlinks.
3. HTML elements tell the browser how to display the content. Detailed

accounts on the importance of HTML can be got by doing a research

4. HTML evolution is discussed in student text book
- e. Application activity 2.2

Answers :

By guidance of the teacher, students answer the question of application activity 2.2

1. **HTML** is not a programming language but can be thought of as a presentation language. Because it is used to instruct the browser on how to present text and multimedia content on the Web.
2. **Hypertext** is text displayed on a computer display or other electronic devices

with references (hyperlinks) to other text that the reader can immediately access.

Hypertext can be defined as text that links to other information. By clicking on a link in a hypertext document, a user can quickly jump to different content.

While hyperlink is a text, phrase or image that you click to go to another web page or a section within the current page or to another website.

3. The particularities of XHTML over HTML4.01

- XHTML support mobile web application
 - The browser will make no assumptions and will allow you, your mistakes.
 - XHTML allows you to create your own self-descriptive tags, or language, that suits your application.
4. Discuss the advantages of HTML 5 comparing to the previous HTML versions.

HTML5 is the fifth revised and newest version of HTML standard offering new features that support multimedia content more effectively than the previous versions.

- HTML5 supports majority of browsers.
- HTML5 doctype is a short statement
- HTML5 comes with Media elements and new input elements

LESSON 3: HTML tags and syntax

a. Learning objectives

- Explain HTML tag and its syntax
- Appreciate the use of HTML tags to create a static web page.

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students have now knowledge and skills about HTML. As they learnt in lesson3: Introduction and evolution of HTML, they can therefore apply the same reasoning on understanding HTML tag and its role.

d. Learning activity

Guidance

- Teacher organizes students in groups in order to do activity.
- Teacher walks around and sees if students are doing activity in their respective groups
- Teacher lets students discuss the syntax and the role of HTML tag.
- Teacher invites 2 or 3 group representatives to present their findings to the rest of class.
- Teacher reacts on answers given by students.
- Based on the answers from Students, teacher introduces the lesson.

Answers of activity 2.3

1. HTML tag is an element name surrounded by angle brackets that has following usage:
 - The `<html>` tag tells the browser that this is an HTML document.
 - The `<html>` tag represents the root of an HTML document.
 - The `<html>` tag is the container for all other HTML elements (except for the `<!DOCTYPE>` tag)
2. The syntax of an HTML tag is: `<tag_name>content goes here...</tag_name>`
3. The role of an HTML attribute
 - An **attribute** is used to define the property or characteristics of an element inside the element's opening tag.
 - Attributes provide additional information about HTML elements
 - An attribute either modifies the default functionality of an element type or provides functionality to certain element types unable to function correctly without them.

e. Application activity 2.3

Answers :

1. HTML tag has this syntax: `<tag_name>content goes here...</tag_name>`
 - `<tag_name>` is the first tag
 - `</tag_name>` is the end tag
 - The content is written inside between the two tags
2. Attributes define additional characteristics or properties of the element such as width and height of an image. Attributes are always specified in the start tag (or opening tag) and usually consists of name/value pairs like `name="value"`. Attribute values should always be enclosed in quotation marks.
3. Given this HTML statement: ` Hello Rwanda Color is an attribute name Green is an attribute value`

There Hello Rwanda will be displayed in green font color into a browser.

LESSON 4: HTML syntax and HTML page structure

a. Learning objectives

Appreciate the use HTML tags to create a static web page

Explain the HTML page structure

b. Teaching resources

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students have now enough knowledge on HTML tags. With this, they can apply the same reasoning on explaining each HTML tag of HTML page syntax.

d. Learning activity

Guidance

- Teacher groups students into small groups so that they share ideas on questions asked in activity 2.4
- Teacher walks around the group to guide the groups and to make sure every member is participating
- In their respective groups, the students discuss also about every element of HTML page syntax.
- Group representative has to present their finding on the asked questions to the rest of the class

- With answers from students, a teacher introduces a lesson.

Answers of activity 2.4

By guidance of the teacher, students answer the question of activity 2.4. students write down code in HTML editor and then save as .html. The result is displayed as below:

This is my first web page

e. Answers of application activity 2.4

1. <DOCTYPE html> start every web page because it is a declaration line, it tells to the browser a type of html version is used.
2. Give HTML tags found between <head>.....</head> tags
 - a. <title...</title>
 - b. <style>...</style>
 - c. <meta>
3. Here below is html code that displays the name of my school:

```
<! DOCTYPE html>
<html>
<head>
<title> my school </title>
</head>
<body>
<h1> UMURERWA FRANCINE </h1>
<h1> Ecole Secondaire UMURAVA</h1>
</body>
</html>
```

LESSON 5: Design a static web page using html tags and hyperlinks

a. Learning objectives

- Identify and describe the html tags that create a static web page
- Appreciate the use of different tags used to create a web page

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with HTML tags. Hence they can apply their skills on design a static web page.

d. Learning activity:

Guidance

- Teacher groups students into small groups so that they share ideas on questions asked in activity 2.5
- Teacher walks around the group to guide the groups and to make sure every member is participating
- In their respective groups, the students, using internet they discuss on different steps followed when you create and execute a web page.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, a teacher introduces a lesson.

Answers of activity 2.5

By guidance of the teacher, Students try to create and save the web page and run it in HTML editor. The result is displayed as below:

e. Answers of application activity 2.5

1. HTML code that displays a name:

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>names</title>
</head>
<body>
<p><h2>My name is: UWINEZA Francine</h2> <p>
</body>
</html>
```

2. The output of the above html document:



LESSON 6: Tags that identify and name documents

a. Learning objectives

- Identify and describe the html tags that identify and name documents
- Appreciate the use of different tags that identify and name documents to create an html document

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with HTML tags and page structures learnt in 55 previous lessons. Therefore, they can apply the same reasoning to create a web page with tags that identify and name a document.

d. Learning activity:

Guidance

Teacher groups Students into small groups so that they share ideas on questions asked in activity 2.6

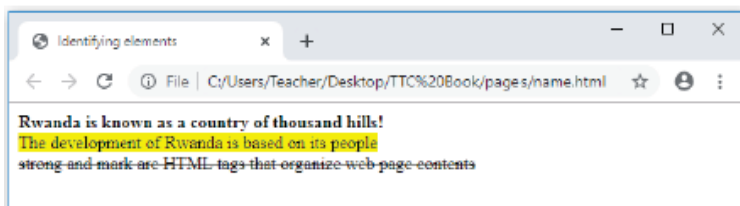
- Teacher walks around the group to guide the groups and to make sure every member is participating
- In their respective groups, the Students, using internet they discuss on different steps followed when you create and execute a web page.
- Group representative has to present their finding on the asked questions to the rest of the class

- With answers from students, a teacher introduces a lesson.

Answers of activity 2.6

By guidance of the teacher, Students try to create and save the given HTML code and run it.

1. The output of given html code:



- The tag is used to separate the text from the rest of the content. Browsers traditionally bold the text found within the tag.
 - The <mark> tag is one of the HTML5 elements. It marks a part of the text which has relevance. It can be used to highlight text for showing emphasis.
 - The tag is used to identify text that has been deleted from a document but retained to show the history of modifications made to the document.
2. HTML tags for changing text color is and the HTML tag for inserting a picture is

e. Answers of application activity 2.6

1. a,b,c,d) Html document which displays your description, academic profile, career aspiration and your photo:

```
<! DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>names</title>
```

```
</head>
```

```
<body>
```

```
<center>
```

```
<p><h1><font color="Red"><mark>1. PERSONAL IDENTIFICATION:</mark></font></font></h1></p>
```

```
<p> <h3> First Name: Theophile </h3></p>
```

```
<p> <h3> Last Name: MUSERUKA </h3></p>
```

```
<p> <h3> Date of birth: 29/7/1996 </h3></p>
```

```
<p> <h3> Martal Status: Single </h3></p>
```

```
<p> <h3> Contact phone: 0783297650 </h3></p>
```

```
<p><h1><font color="Red"><mark>2. ACADEMIC PROFILE:</mark></font></font></h1></p>
```

```
<p> <h3> Institution: University of Madras </h3></p>
```

```
<p><h1><font color="Red"><mark>3. CAREER ASPIRATION:</mark></font></font></h1></p>
```

```
<p> <h3> Information and Technology</h3></p>
```

```
<p><h1><font color="Red"><mark>3. The following is my own photo:</mark></font></font></h1></p>
```

```

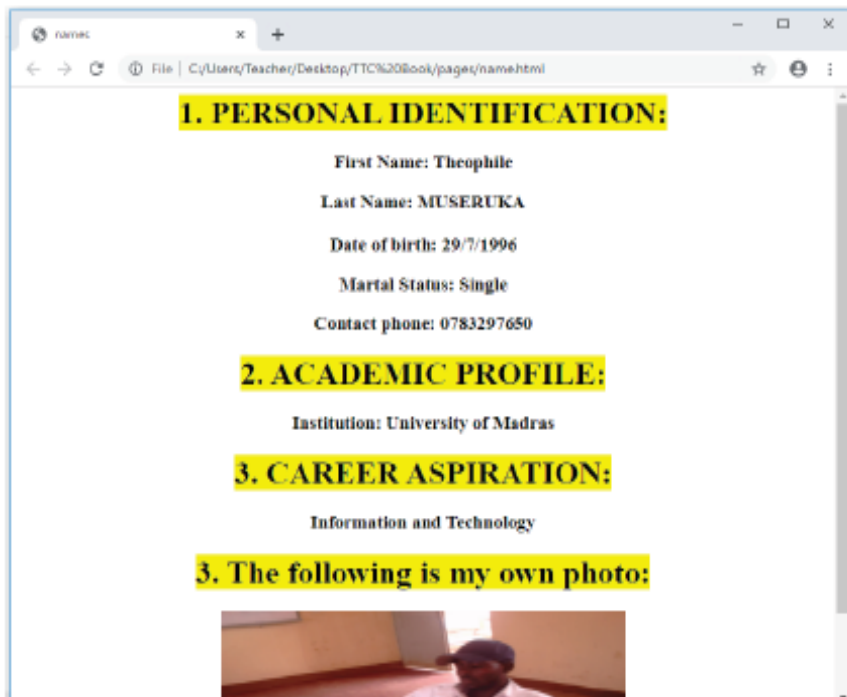
```

```
</center>
```

```
</body>
```

```
</html>
```

The output:



2.
 - a. Color attribute sets a font color of a text
 - b. Size attribute sets a font size of a text
3. The src in the < img> tag is an important attribute that specifies the location (source) or URL of the image you want to insert onto the page.
 - The alt attribute specifies alternate text for an image, if the browser cannot display or locate the image.
 - The align attribute is used to align an image on top, bottom, left or right of the browser window.

LESSON 7: HTML lists: Ordered and Unordered list

a. Learning objectives

- Identify and describe the html tags that organize web page contents.
- Appreciate the use of different tags that organize web page contents in website creation.

b. Teaching resources:

Computer lab with internet, projector, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with HTML tags that identify and name documents learnt in lesson 7. Therefore, they can apply the same reasoning to create a web page with tags that organize web page contents especially creation of ordered and unordered list pages

d. Learning activity:

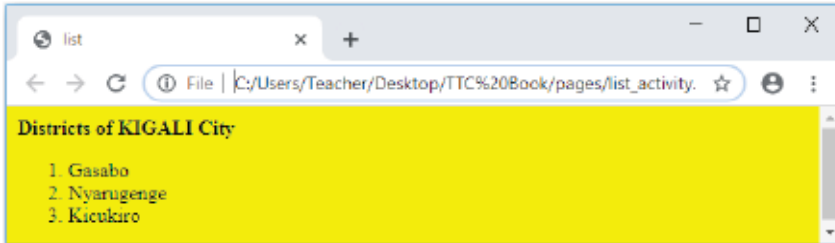
Guidance:

- Teacher groups students into small groups so that they share ideas on questions asked in activity 2.7
- Teacher walks around the group to guide the groups and to make sure every member is participating.
- In their respective groups, the students, using internet they discuss on different ways used while organizing an HTML web page contents.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, a teacher introduces a lesson.

Answers of activity 2.7

1. Students write code in HTML editor and save the given HTML code and run it.

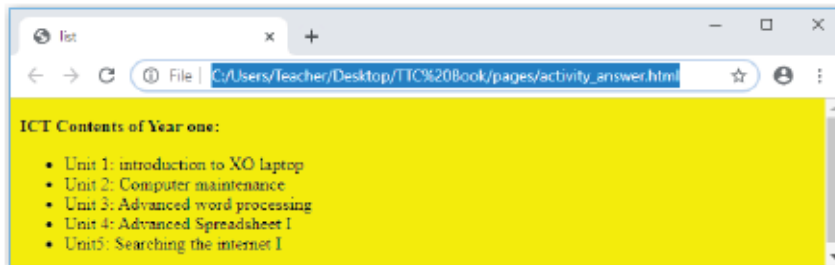
Output of a given html code:



The web page content is organized in ordered list.

e. Answers of application activity 2.6

1. The given HTML code displays unordered list of 5 items as shown on the following figure.



2. The HTML document below, displays unordered list of 5 items using square bullet types.

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>list</title>
```

```
</head>
```

```
<body bgcolor="yellow">
```

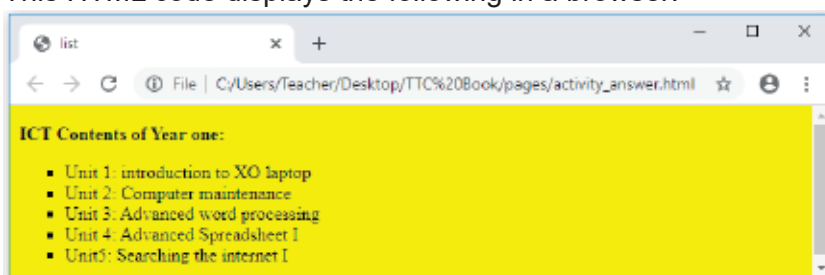
```
<p><Strong> ICT Contents of Year one:</strong></p>
```

```

<ul type="square">
<li>Unit 1: introduction to XO laptop </li>
<li>Unit 2: Computer maintenance </li>
<li>Unit 3: Advanced word processing </li>
<li>Unit 4: Advanced spreadsheet I </li>
<li>Unit5: Searching the internet I </li>
</ul>
</body>
</html>

```

This HTML code displays the following in a browser:



LESSON 8: HTML lists: Definition and Nested lists

a. Learning objectives

Appreciate the use of <dl> , and html tags which create definition and nested lists web pages.

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with HTML tags that organize web page content into ordered and unordered lists learnt in previous lesson 7. Therefore, they can apply the same reasoning on creating a definition list page.

d. Learning activity:

Guidance

- Teacher groups students into small groups so that they share ideas on questions asked in activity 2.8
- Teacher walks around the group to guide the groups and to make sure every

member is participating.

- In their respective groups, the students discuss on answers of activity.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, a teacher introduces a lesson.

Answers of activity 2.8

1. The list is defined as a definition list. A definition list is a list which present a glossary of terms, or other lists like dictionary and encyclopedia.
2. Below are codes to display the definition list

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>Definition list </title>
```

```
</head>
```

```
<body>
```

```
<dl>
```

```
<dt><b>RDB </b></dt>
```

```
<dd>RDB stands for Rwanda Development Board </dd>
```

```
<dt><b>RURA </b></dt>
```

```
<dd> RURA stands for Rwanda Utilities Regulatory Authority </dd>
```

```
<dt><b>RGB </b></dt>
```

```
<dd>RGB stands for Rwanda Governance Board</dd>
```

```
<dt><b>RSB</b></dt>
```

```
<dd>RSB stands for Rwanda Standards Board</dd>
```

```
</dl>
```

```
</body>
```

```
</html>
```

LESSON 9: HTML frame and table tags

a. Learning objectives

Identify and describe HTML tags that create frames and tables.

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with HTML tags that organize web page content

The knowledge and skills about frames and table creation using HTML.

d. Learning activity:

Guidance

- Teacher groups students into small groups so that they share ideas on questions of activity
- Teacher walks around the group to guide the groups and to make sure every member is participating. - In their respective groups, the Students discuss on answers of activity.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, a teacher introduces a lesson.

Answers of activity 2.9

With teacher guidance, students find out answers of the activity:

1. Parts of a web page or a browser that display the content independent of its container are called frames.
2. HTML tags that create a table:

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title> Table in HTML </title>
```

```
</head>
```

```
<body>
```

```
<table border="1">
```

```

<tr>
<th>Nothern Province</th>
<th>East Province </th>
<th>West Province</th>
<th>South Province</th>
</tr>
<tr>
<td>Musanze</td>
<td>Bugesera</td>
<td>Rubavu</td>
<td>Nyanza</td>
</tr>
<tr>
<td>Gicumbi</td>
<td>Kirehe</td>
<td>Karongi</td>
<td>Ruhango</td>
</tr>
</table>
</body>
</html>

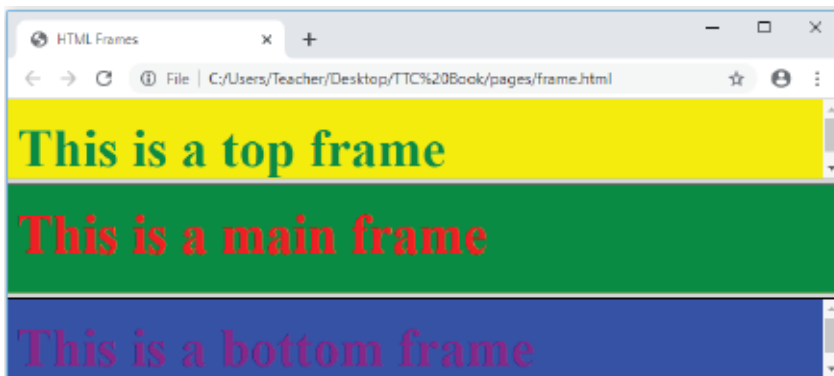
```

e. Answers of application activity 2.9

- a) <Frameset> tag creates a group of frames to which web pages and media can be directed.
 - b. <caption>...</caption> used to create the table caption
 - c. Colspan attribute specifies the number of columns a cell should span.
 - d. <th> tag is used to create the table heading
- Here below is an html document that creates web page with three frames:

```
<!DOCTYPE html>
<html>
<head>
<title>HTML Frames</title>
</head>
<frameset rows="30%,40%,30%">
<frame name="top" src="TOP.html" />
<frame name="main" src="MAIN.html" />
<frame name="bottom" src="BOTTOM.html" />
<noframes>
<body>
Your browser does not support frames. </body>
</noframes>
</frameset>
</html>
```

Its output is:



3. This html table page:

SAVE PARENTS'SCHOOL ADMINISTRATION STAFF

Employee's information						
RegNo	Firstname	Lastname	Phone	Age	Position	Salary
11	Jean Claude	UWIHANGANYE	0783297650	45	Head Teacher	400000Rwf
19	Diedonne	KAYIBANDA	0784298651	55	Head of Studies	300000Rwf
7	Pelagie	MUKANDORI	0784228661	51	Head of Discipline	250000Rwf
12	Dhalie	NIZEYIMANA	0780615775	35	Accountant	200000Rwf

Is created by the following HTML document:

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>Table attributes </title>
```

```
</head>
```

```
<body>
```

```
<table border="2" cellpadding="2" cellspacing="2" width="600"height="100">
```

```
<Caption><b> SAVE PARENTS'SCHOOL ADMINISTRATION STAFF</b></caption><BR>
```

```
<tr>
```

```
<th colspan=7> Employee's information</th>
```

```
</tr>
```

```
<tr>
```

```
<th>RegNo</th>
```

```
<th>Firstname</th>
```

```
<th>Lastname</th>
```

```
<th>Phone</th>
```

```
<th>Age</th>
```

```
<th>Position</th>
```

```
<th>Salary</th>
```

```
<tr>
```

<td>11</td>
<td>Jean Claude</td>
<td>UWIHANGANYE</td>
<td>0783297650</td>
<td>45</td>
<td>Head Teacher</td>
<td>400000Rwf</td></tr>
<tr>
<td>19</td>
<td>Diedonne</td>
<td>KAYIBANDA</td>
<td>0784298651</td>
<td>55</td>
<td>Head of Studies</td>
<td>300000Rwf</td></tr>
<tr>65

<td>7</td>
<td>Pelagie</td>
<td>MUKANDORI</td>
<td>0784228661</td>
<td>51</td>
<td>Head of Discipline</td>
<td>250000Rwf</td></tr>
<tr>
<td>12</td>
<td>Dhalie</td>
<td>NIZEYIMANA</td>

```
<td>0780615775</td>
<td>35</td>
<td>Accountant</td>
<td>200000Rwf</td></tr>
</table>
</body>
</html>
```

LESSON 10: HTML Forms

a. Learning objectives

Identify and describe HTML tags that create form web pages

Appreciate the use of HTML form tags to create form web pages

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with HTML tags that organize web page content into any type of a list as learnt in lesson 7 and 5. Therefore, they can develop quickly the knowledge and skills about form creation using HTML.

d. Learning activity:

Guidance

- Teacher groups students into small groups so that they share ideas on questions of activity
- Teacher walks around the group to guide the groups and to make sure every member is participating.
- In their respective groups, the students discuss on answers of activity.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, the teacher introduces a lesson.

Answers of activity 2.10

With a guidance of a teacher, students answer questions of activity:

The given page is a form web page

Please provide your registration details and click SEND button

Your first name:

Your second name:

Your nationality:

Your phone number:

Your Email:

Your password:

1. An HTML form is a section of a document containing normal content, markup, special elements called controls (checkboxes, radio buttons, menus, etc.), and labels on those controls
2. Form, web form or HTML form on a web page allows a user to enter data that is sent to a server for processing. Forms can resemble paper or database forms because web users fill out the forms using checkboxes, radio buttons, or text fields.
3. Code used to do the form are available in student book.

e. Answers of application activity 2.10

1. **a. Action attribute:** The action attribute is used to specify the file on the server that receives data from the form for processing.
b. Method attribute: The Method attribute specifies how the data is to be sent to the web server. The method attribute specifies the HTTP method (GET or POST) to be used when submitting the forms
c. Textarea tag: Textarea control is a multi-line text input used when the user is required to give details that may be longer than a single sentence.
2. The syntax of Select or (Drop-Down List) form element

```
<select name=" " >
```

```
<option value1=" " >...</option>
```

```
....
```

```
<option value=" " >...</option>
```

```
</select>
```

3. Given the following form web page:

3. Given the following form web page:

Username:

Password:

Phone:

Country Music

Jazz Music

Techno Music

Rock Music

Male

Female

MCE ▾

Comments:

Send

This web page is displayed by the following html document:

```
</head>
<body >
<center>
<table><form Action= "login.php" Method= "get" >
<tr><td>Username:</td> <td><input type= "text" name= "FName" size="15"></
td></tr>
<tr><td>Password:</td> <td><input type= "password" name= "pass"size="10"></
td></tr>
<tr><td>Phone:</td> <td> <input type= "text" name= "phone" size="13"></ td></tr>
<tr><td><input type="checkbox" name="music" checked="checked"></td> <td>
Country Music</td></tr>
<tr><td><input type="checkbox" name="music" ></td> <td> Jazz Music</td></ tr>
<tr><td><input type="checkbox" name="music" ></td> <td> Techno Music</ td></
tr>
<tr><td><input type="checkbox" name="music" ></td> <td> Rock Music</td></ tr>
<tr><td><input type="radio" name="sex" value="male" checked="checked" ></ td>
<td> Male</td></tr>
<tr><td><input type="radio" name="sex" value="female"></td> <td> Female</ td>
<tr><td><select name=" dropdown"> <option value="MCE" selected>MCE</
```

```

option>
<option value="MPG">MPG</option>
<option value="PCB">PCB</option> </select> </td></tr>
<tr><td>Comments:</td><td> <textarea rows="3"cols="10" name="comment">
</textarea></td></tr>
<tr><td><input type="submit" name="submit" value="Send"></td></tr> </ form></
table>
</center>
</body>
</html>

```

LESSON 11: Particularities of HTML 5

a. Learning objectives

Explain specifications of HTML5

Appreciate the use of HTML5 new input types to create form web pages

b. Teaching resources:

Computer lab with internet, textbooks to facilitate research

c. Prerequisites

Students have knowledge about Introduction to html and its evolution. They are also familiar with html form controls. Therefore, they can apply the same reasoning to create form web pages with new inputs types.

d. Learning activity:

Guidance

- Teacher groups student into small groups so that they share ideas on questions of activity
- Teacher walks around the group to guide the groups and to make sure every member is participating.
- In their respective groups, the Students discuss on answers of activity.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, a teacher introduces a lesson.

Answers of activity 2.11

1. HTML 5 came with new features that support multimedia content more effectively than previous versions.
2. HTML5 has taken over other versions because:
 - It supports multimedia content
 - HTML 5 is supported by majority of browsers.
 - HTML 5 doctype is short comparing to doctypes of previous versions.
 - New elements such as <header>, <footer>, <section >have been added.
 - User can easily drag and drop elements from one location to another on the same webpage.
3. Examples of new input types of HTML5

Refers to student text book (lesson11: **Particularities of HTML 5**)

e. Answers of application activity 2.11

1. HTML5 DOCTYPE is <! DOCTYPE html>
2. The basic idea behind HTML5 validation is, that you tell the browser which fields you want validated but don't actually do the tedious implementation yourself. As you define what state your input field is in your form also asks the browser to validate the field client-side based on the type of input field
3. a. **Email type:** Accepts only valid email addresses. If you try to submit a simple text, it forces to enter only email address is momo@gmail.com format
b. **Datetime type:** Date and time (year, month, day, hour, minute, second, fractions of a second) encoded according to ISO 8601 with the time zone set to UTC.
c. **URL type:** Accepts only valid URL address values. If you try to submit a simple text, it forces you to provide valid URL address in http:// www. example.com format.
4. Migration from HTML4 to HTML 5 is a brave decision that should not be held back due to few people who are resistant to change because of the following:
 - **Deprecated elements and attribute**

Deprecated elements are features that have been rendered obsolete but that browsers may continue supporting them. Examples of deprecated features are border attribute used with element and name attribute in the anchor <a> element.

- **Browser support**

Browser support is one of the key factors to consider when migrating from HTML4 to HTML5. Fortunately, since HTML5 became a W3C recommendation in October, 2014, major browsers like Safari, Chrome, Firefox, Opera and Internet Explorer 9.0 have started supporting to HTML5 features.

5. `<!DOCTYPE html>`

```
<html>
```

```
<head>
```

```
<title> New HTML5 input types</title>
```

```
</head>
```

```
<body>
```

```
<p><em><strong><font size=36 color="green">This page contains  
examples of form control that can be used in HTML5.
```

```
</font></strong></em></p>
```

```
<form action="new_input.php" method ="post">
```

```
<p> Text element:<input type="text" name="user" size=15></p>
```

```
<p> Email:<input type="email" name="mail" size=20></p>
```

```
<p> Month:<input type="month" name="month"> </p>
```

```
<p> Number:<input type="number" name="number"> </p>
```

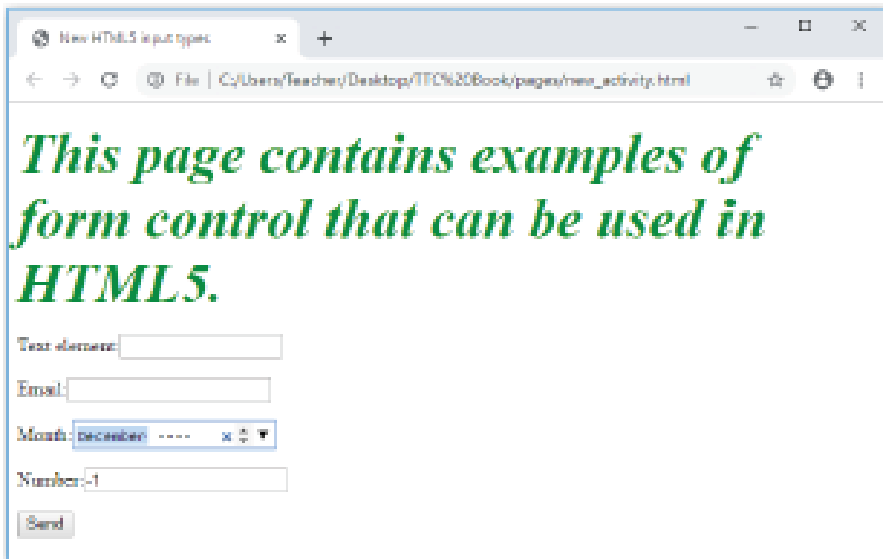
```
<input type="submit" value="Send" name="button"><br/>
```

```
</form>
```

```
</body>
```

```
</html>
```

This html code displays the following:



LESSON 12: Creation of links

a. Learning objective

Appreciate the use of <a> tag that creates a hyperlink

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with html tags that can create any web page Therefore, they can apply the same reasoning on creating linked web pages.

d. Learning activity:

Guidance

- Students in groups they discuss about questions of activity
- In their respective groups, the students discuss on answers of activity.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, a teacher introduces a lesson.

Answers of activity 2.12

1. **A link** is A hyperlink is a text, phrase or image that you click to go to another web page or a section within the current page or to another website.
2. **Internal link**

A local(**internal**) link (link to the same web site) is specified with a relative URL (without http://www....). While external links a web site to another one. IT is specified with a relative URL.

e. Answers of application activity 2.12

1. Definitions of terms: hyperlink, hypertext and HREF attribute are found in a student text book lesson 12(Creation of links).
2. Refers student book to answer this question
3. The “ image link” code means that word “image link” is a hyperlink and when it is clicked on the user is directed to the page photo.html
4. First.html page below is linked to second.html page:

First.html page

```
<! DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>linking page</title>
```

```
</head>
```

```
<body>
```

```
<p><font color="orange" size="20"> For getting more information about HTML 5,  
Click following next link:
```

```
</font></p>
```

```
<a href="second.html"><b>Next</b></a>
```

```
</body>
```

```
</html>
```

Second.html page

```
<! DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>linking page</title>
```

```
</head>
```

```
<body>
```

```
<p><font color="orange" size="20"> INTRODUCTION TO HTML 5
```

```
</font></p>
```

```
<center><h4>HTML5 is the fifth revised and newest version of HTML standard offering new features that support multimedia content more effectively than the previous versions.
```

```
To be supported by majority of browsers, HTML5 has been developed in collaboration with browser makers.
```

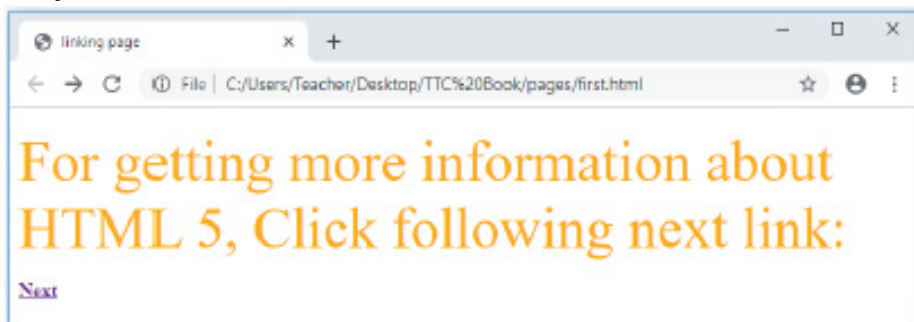
```
This explains why most browsers are supporting the new HTML5 specification.
```

```
<h4></center>
```

```
</body>
```

```
</html>
```

Output:



LESSON 13: Back end vs Front end

a. Learning objectives

Explain what is Front end and Back end in website design and development

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Students are now familiar with basic html tags that can organize and create form elements found in Front end and students already have knowledge and skills about database (Back end) creation and management using MS Access. As they learnt Unit 4 in Senior 4 on; they can therefore apply the same reasoning in coming lessons.

d. Learning Activity:

Guidance

- Teacher groups students into small groups in order to do the activity 2.13
- Teacher walks around in the groups and guide the groups and to make sure every member is participating.
- In their respective groups, the Students discuss on answers of activity 2.13.
- Group representative has to present their finding on the asked questions to the rest of the class
- With answers from students, a teacher introduces a lesson.

Answers of activity 2.13

The difference between Front end and Back end in the web site design and development process in student text book.

e. Answers of application activity 2.13

Refers student book to answer this activity

2.6 Summary of the unit

Today, large corporations, medium-sized, small -scale business, organizations and individuals are using websites and web applications to communicate company information, manage their projects and advertise their activities. People are now connected with their friends and family members on social media such as Facebook, Twitter, Instagram, YouTube and these social media technologies were developed using web design techniques. In this unit, we discussed HTML language used in designing website and web applications.

Below are the main concepts discussed in this unit:

A website is a collection of several web pages with information on a subject (documents that are accessed through the internet) that are connected together.

A Web application (Web app) is an application program that is stored on a remote server and delivered over the Internet through a browser interface.

A website can be static or dynamic. In this unit, we only discussed about the on static website. A static web site is site that is typically written in plain HTML and what is in the code of the page is what is displayed to the user and it does not use database. A dynamic webpage is one whose contents do change, and generally

change very quickly and it uses database.

A static web page is made of different web pages. HTML page has the following structure:

```
<html>
```

```
<head>
```

Document header related tags

```
</head>
```

```
<body>
```

Document body related tags

```
</body>
```

```
</Html>
```

There are different HTML tags that create different web pages:

- Tags that identify and name documents such as heading tags, image, formatting tags etc.
- Tags that organize web page contents such as:
 - Ordered and Unordered list: `` and ``
 - Definition and Nested lists `<dl>`
 - nested lists: a list inside another type of a list
 - Frame and Table tags : `<frameset>` and `<table>`
 - HTML Forms: `<form>`

Nowadays, HTML5 is more useful comparing to other previous HTML versions because of its specifications:

- It offers new features that support multimedia contents
- It is designed to be supported by majority of browsers
- It comes with elements (media elements and new input types)

HTML pages are linked by hyperlinks for being called website .HTML link is created by anchor element `<a>...`. It has this syntax: `link text`

The website creation project involves these steps:

The exact process will vary slightly from designer to designer, but the basics are the same.

- **The front end** is the part of the website, users can see and interact with. It is

developed using Visual Basic, HTML, etc programming languages

- **The back end** can also be referred to as the “**server side**” of a website. It can be built using different Relational Database Management Systems such as Microsoft Access, SQL Server, Oracle etc.

2.7 Additional information

New HTML5 Elements

The new HTML5 elements may be classified into three categories namely: **Structural, Input, and Media elements.**

Structural elements: HTML5 offers new semantic elements used to define the structure of a web page. Examples of structural elements include <article>, <aside>, <header>, <footer>, <main>, <section>, <summary> and <nav>

Input elements: New input types were introduced to address specific form input and formatting requirements for user input such as dates, numbers, and telephone numbers. Examples of new input types include color, date, datetime, time, email, number, tel, url

Media elements: Due to high demand of multimedia content on the web, WC3 introduced new set of media elements in HTML5 to handle different media types without need for additional plugins such as Adobe flash. New media elements include <embed>, <audio>, <source>, <track> and <video>.

Colors



One of the most important formatting features in web design and development has to do with the right application of color. Color can be applied to text (font) or the background of a section or entire page.

In HTML, color can be specified in either of three ways:

1. Using a valid color name as a value in a declaration e.g. “red”, “blue”
2. Using a valid hexadecimal (HEX) value e.g. #ff1100, #BB00CC
3. Using the Red, Green, Blue (RGB) scheme e.g. “rgb(200,1,1)”

Example:

Let apply rgb color to set a background of a page. Consider the following HTML

Color	Name
	Red
Color	HEX
	#FF0000
Color	RGB
	rgb(255,0,0)

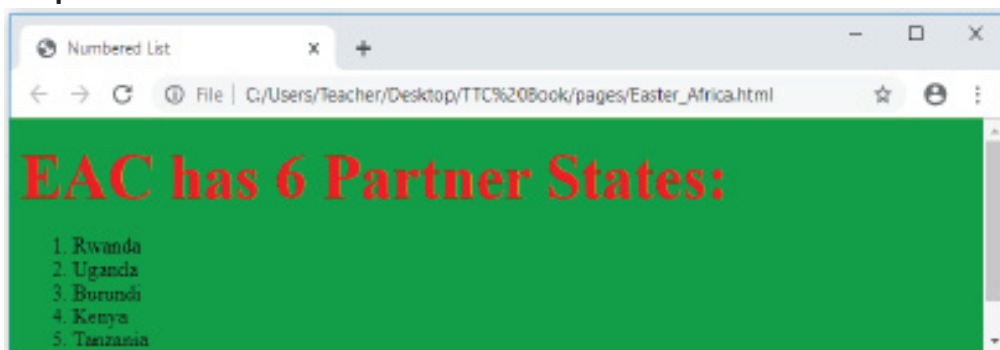
Let apply rgb color to set a background of a page. Consider the following HTML document:

```

<!DOCTYPE html>
<html>
<head>
<title>Numbered List</title>
</head>
<body bgcolor="rgb (195,45,203)">
<p><Strong><font color="red" size=72>
EAC has 6 Partner States:</font></strong></p>
<ol >
<li>Rwanda</li>
<li>Uganda</li>
<li>Burundi </li>
<li>Kenya</li>
<li>Tanzania</li>
<li>South Sudan</li>
</ol>
</body>
</html>

```

Output:



2.8 End unit assessment

1. Answer of this questions are referred to lesson 1: Definitions of basic concepts in student text book.
2. An **internet** is the network of computers and other communication devices connected together around the world, allowing information and resources to be shared globally while **web** is the common name for the World Wide Web, a subset of the internet consisting of the pages that can be accessed by a web browser.

A **web** can be also defined as a system of internet servers that support specially formatted documents. The documents are formatted in a markup language called HTML (HyperText Markup Language) that supports links to other documents.⁷⁷

3. A program, such as Mozilla Firefox that lets a user display HTML-developed web pages is referred to as a **web browser**.
4. Three key factors that a web developer should consider before developing a website

- **Usability**

One of the most important aspects of web designing is actually making the site usable for the average user. Most customers who visit your website are not professional HTML coders, so they might need things simplified a little bit (which is fine)

- **Speed**

Website speed can make or break your entire company. If the page does not load within three to five seconds, users will go mad. They will likely exit your web page and never return, causing you to lose out on their potential business.

- **Content**

Users are very picky. Even if your webpage is easily accessible, functions well, works

quickly, and looks great, they still won't be pleased unless you have compelling and engaging content on your site. Content marketing plays a major role in any company's advertising campaign. People much prefer video content over written, which is why content video views have exceeded 50 billion views per month.

5. Three types of image formats that can be inserted into a web page:

- a. **GIF** (Graphics Interchange Format): You can take advantage of the characteristics of lzw compression to improve its efficiency and thereby reduce the size of your gif graphics. The gif format allows you to pick colors from the color lookup table of the gif to be transparent.
- b. **JPEG** (Joint Photographic Experts Group): The other graphic file format commonly used on the web to minimize graphics file sizes is the Joint Photographic Experts Group (jpeg) compression scheme. Unlike gif graphics, jpeg images are full-color images that dedicate at least 24 bits of memory to each pixel, resulting in images that can incorporate 16.8 million colors.
- c. **PNG** (Portable Network Graphics): png graphics were designed specifically for use on web pages, and they offer a range of attractive features, including a full range of color depths, support for sophisticated image transparency, better interlacing, and automatic corrections for display monitor gamma. png supports full-color images and can be used for photographic images.

6. An HTML statement which demonstrates how to insert.

a. **An image of a car:**

```
<img src= "car.jpg" width= "250 px"height= "400px" alt= "car picture">
```

b. **Page with four horizontal frames**

```
<frameset rows="20%,20%,20%,20%" > .....</frameset>
```

c. **Table of 5 rows and 8 columns**

```
<table border="4" cellpadding="3" cellspacing="3" width="400"height="200"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr>
```


That is if a row spans two rows, it means it will take up the space of two rows in that table.

- 2) Write the syntax of setting a color a body background

Answer: `<body bgcolor="value" >`

Note that value should be a color name, color in hexadecimal format or RGB format.

2.9.2 Consolidation activity

- 1) Explain any two objects of an HTML form
- 2) Differentiate between definition list and nested list

Answers :

- Answer of this question is referred to lesson 11: HTML FORMS in student text book.

Refers to student text book lesson 9; HTML lists: Definition and Nested lists

2.9.3 Extended activity

Write an html document which displays a definition list of three items.

Answers :

```
<! DOCTYPE html>
<html>
<head>
<title>Definition list </title>
</head>
<body>
<dl>
<dt><b>GIF </b></dt>
<dd>GIF stands for Graphics Interchange Format </dd>
<dt><b>PNG</b></dt>
<dd> PNG stands for Portable Network Graphics</dd>
<dt><b>JPEG</b></dt>
<dd>JPEG stands for Joint Photographic Experts Group</dd>
</dl>
</body>
</html>
```