ICT

TUTOR'S GUIDE

FOR TTC

3

OPTIONS:

SME, SSE, ECLPE & LE

FOREWORD

Dear tutor,

Rwanda Basic Education Board is honored to present Year Three Tutor's guide which serves as a guide to competence-based teaching and learning to ensure consistency and coherence in the learning of the computer science subject. The Rwandan educational philosophy is to ensure that Student teachers achieve full potential at every level of education which will prepare them to be well integrated in society 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 tutors' pedagogical approaches, the assessment strategies and the instructional materials available. Special attention was paid to the activity that facilitate the learning process in which Student teachers can develop ideas and make new discoveries during concrete Activity carried out individually or with peers. With the help of tutors, Student teachers 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 lives 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 tutor. In competence-based curriculum, learning is considered as a process of active building and developing of knowledge and understanding, skills, values and attitudes by the learner, where concepts are mainly introduced by an activity, situation or scenario that helps the learner to construct knowledge, develop skills and acquire positive attitudes and values.

In addition, such active learning engages Student teachers in doing things and thinking about the things they are doing. 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 materials.
- Organize group discussions for Student teachers considering the importance of social constructivism suggesting that learning occurs more effectively when the learner works collaboratively with more knowledgeable and experienced people.
- Engage Student teachers through active learning methods such as inquiry methods, group discussions, research, investigative Activity and group and

individual work Activity.

- Provide supervised opportunities for Student teachers to develop different competences by
- giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.
- Support and facilitate the learning process by valuing learners' contributions in the class Activity.
- Guide Student teachers 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 Activity, the content of this tutor'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 book and gives you methodological guidance;

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

The part 3: Provides details on the teaching guidance for each concept given in the student teacher's book.

Even though this tutor's guide contains the answers for all Activity given in the learner's book, you are requested to work through each question and activity before judging learner's findings.

I wish to sincerely appreciate all people who contributed towards the development of this tutor's guide, particularly REB staff who organized the whole process from its inception. Special gratitude goes to the University of Rwanda which provided experts in design and layout services and teachers who diligently worked to the successful completion of this book. Any comment or contribution would be welcome for the improvement of this Tutor's guide for the next edition.

Dr. MBARUSHIMANA Nelson
Director General of REB

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PART I. GENERAL INTRODUCTION

I.0. About the tutor's guide

This book is a tutor's guide for ICT Year Three in TTC options. It is designed to help tutors in the implementation of competence based curriculum specifically ICT syllabus.

As suggested by its name, this is a guide that will help tutors in their daily preparations of lessons. Tutors will take advice provided for in this book but are advised to be more creative and consider their specific classes' contexts and prepare accordingly.

I.1.The structure of the guide

This section outlines the general structure whereby the content is organized in units and subheadings in order to provide to tutors more understanding of the different sections of this guide and what they should expect to find in each section.

Overall structure

This consists of three main parts:

- **Part I: General Introduction.**

This part provides general guidance on how to develop the generic competences, how to integrate cross cutting issues, how to take into consideration special educational needs, active methods and techniques of teaching ICT and guidance on assessment.

- **Part II: Sample lesson plan**

This provides to tutors a model lesson plan that they can learn from in devising their own lesson plans.

- **Part III: Unit development**

This is the main part of the guide in which each unit is thoroughly developed. 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)**

The section indicates knowledge, skills and attitudes required for the successful carrying out of the unit. The competence-based approach requires connections between units/topics within a subject and interconnections between different subjects. The tutor 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 integrated depending on the unit content. It gives guidance on how to integrate those issues. The suggested issues are indicative and tutors are free to take any other cross-cutting issue which is related to the learning environment.

- **Guidance on the introductory activity**

Each unit begins with an introductory activity in the learner's book. This section of the tutor's guide provides guidance on how to conduct this activity and related answers.

Student teachers are not expected to necessarily give right solutions but are invited to provide possible solutions or answers through discovery activity organized at the beginning of lessons or during the lesson.

- **List of lessons**

The section of "list of lessons" provides a 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 Tutor's guide provides the following sections:

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

Structure of each sub heading

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

Lesson title 1: ……………………………..

a) Learning objectives:

States the main points that have to be achieved by the end of the lesson. The proof of achievement of these objectives is got through evaluation done at the end of the lesson.

b) Teaching resources

This section provides suggestions on the teaching aid or other resources needed with activity in order to achieve the learning objectives. Tutors have full ownership of which teaching aid they can use depending on those available in their working environment.

c) Prerequisites/Revision/Introduction:

The section provides clear instruction to tutors on how to begin the lesson

d) Learning activity

This section provides a short description of the methodology and any important aspect to consider. It provides also answers to learning Activity with cross reference to the text book:

e) Exercises/application activity

This provides answers for exercises/application activity

I.2. Methodological guidance

I.2.1. Developing competences

Since the introduction of the competency based curriculum for pre-primary, primary and general secondary education in 2015 Rwanda shifted from the knowledge based system to new way of teaching and learning which puts the learner at the center. In this new approach tutors are not only responsible for the transfer of knowledge but also for enhancing Student teacher's learning achievement, and creating safe and supportive learning environment. It implies also that Student teachers will have to show what they are able to do using the knowledge, skills, values and attitude acquired in a new or different situation.

The competence-based curriculum approach bases teaching and learning on discrete skills rather than relying on only knowledge or the cognitive domain of learning. It puts an emphasis on what student teachers can do rather than what they know. Student teachers 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 activity disseminated in learner-centered rather than the traditional didactic approach. The student teacher is evaluated against set standards to achieve before moving on.

Adding to specific subject competences, student teachers also get an opportunity to 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 Activity that develop generic competences
Critical thinking	• Compare the protected computer to the computer exposed to various security threats • Demonstrate the advantage of programming and improved database
Research and Problem solving	• Research using internet or books from the library • Use the different office programs to solve problems related to elaborating professional documents
Innovation and creativity	• Bring advanced embellishments in In web design
Cooperation, Personal and Interpersonal management and life skills	• Sharing resources using social media • Protecting his/her own data and school or institution data to virus attacks • Work in Pairs, small group work and large group work
Communication	• Organise and present in writing and verbally a complete and clear report of their Activity • Select and use appropriate formats such as tables, graphs and diagrams.
Lifelong learning	• Exploit all opportunities available to improve on knowledge and skills. Use open source technologies and other digital materials to keep informed

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 tutor need to address all of them whenever an opportunity arises. In addition, student teachers 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 issue	Examples on how to integrate the cross-cutting issue
Inclusive education	Involve all student teachers in all activity without any bias. Eg: • Allow a learner with physical disability (using wheelchair) to take notes or lead the team during computer lab Activity. • Student teacher without arms can learn ICT using their toes. • Sign language can be used to address the need of Student teachers with hearing impairments.
Gender	• Involve both girls and boys in all activities: No activity is reserved only to girls or boys. • Tutors should ensure equal participation of both girls and boys during activity as well as during cleaning and tidying up related activity after computer lab activity.
Peace and Values Education	• During group activity, debates and presentations, the tutor will encourage Student teachers to help each other and to respect opinions of colleagues. • Student teachers must be warned about cyber security crimes and enabled to prevent hacking and stealing one's data or prevent unauthorized access to data of a person or institution. • Student teachers must develop values of browsing relevant content on the internet (Student teachers should not spend their time browsing irrelevant and harmful content)
Standardization culture	• Student teachers should be familiar with standards used in computers in their daily interaction with different tools used in online communications
Financial Education	• Student teachers should develop this by comparing the use of digital technologies with the traditional paper based practices and analyze the benefits of the new ways • Different technologies used in networking should be an opportunity to study cost implication of individual technology • Student teachers do analysis of financial benefits of using a computer • Student teachers must be aware of loss that can be caused by not having reliable database for institutions

I.2.2. Attention to special educational needs and inclusive education

In the classroom, student teachers learn in different ways depending on their learning pace, needs or any other special problem they might have. However,

the tutor has the responsibility to know how to adopt his/her methodologies and approaches in order to meet the learning needs of each student teacher in the classroom. Also tutors need to understand that student teacher with special needs, have 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, tutors need to:

- Remember that student teachers 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 Activity)
- Maintain an organized classroom and limit distraction. This will help Student teachers 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 teachers. Some student teachers process information and learn more slowly than others;
- Break down instructions into smaller, manageable tasks. Student teachers 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 teacher 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. Both student teachers will benefit from this strategy;
- Use multi-sensory strategies. As all student teachers learn in different ways, it is important to make every lesson as multi-sensory as possible. Student teachers 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 teacher is unique with different needs and that should be handled differently.

Strategy to help a student teacher with visual impairment:

- Help Student teachers to use their other senses (hearing, touch, smell and taste) to play and carry out activity that will promote their learning and development.
- Use simple, clear and consistent language.
- Use tactile objects to help explain a concept.

- If the Student teacher has some sight, ask him/her what he/she can see.
- Make sure the student teacher has a group of friends who are helpful and who allow him/ her to be as independent as possible.
- Plan Activity so that student teachers work in pairs or groups whenever possible

Strategies to help a student teacher with hearing disabilities or communication difficulties:
- Always get the student teacher's attention before you begin to speak.
- Encourage the student teacher to look at your face.
- Use gestures, body language and facial expressions.
- Use pictures and objects as much as possible.
- Keep background noise to a minimum.

Strategies to help a student teacher with physical disabilities or mobility difficulties:
- Adapt activity so that student teachers who use wheelchairs or other mobility aids, 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 teacher to reach it or fit their legs or wheelchair under.
- Get advice from parents or a health professional about assistive devices.

I.2.3. Guidance on assessment

Each unit in the tutor's guide provides additional activity to help student teachers achieve the key unit competence. Results from assessment inform the tutor which learner needs remedial, consolidation or extension activity. These activities are designed to cater for the needs of all categories of learners; slow, average and gifted Student teachers 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 learners' learning and tutor'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 should play a big role in teaching and learning process. The tutor should encourage individual, peer and group evaluate the work done in the

classroom and uses appropriate competence-based assessment approaches and methods.

In Year Three ICT textbook, formative assessment principle is applied through checking up Activity 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 student teachers 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 tutor, 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.

I.2.4. 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 objectives; instructional materials available; 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 student teachers

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

b) Sensing and intuitive student teachers

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

c) Visual and verbal student teachers

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

d) Sequential and global student teachers

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

I.2.5. Teaching methods and techniques that promote the active learning

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

What is active learning?

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

The role of the tutor in active learning

- The tutor engages student teachers through active learning methods such as inquiry methods, group discussions, research, investigative Activity and group and individual work activity.
- 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 student teachers to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.
- Tutor supports and facilitates the learning process by valuing learners' contributions in the class activity.

The role of student teachers in active learning

Student teachers 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 student teachers through presentations, discussions, group work and other learner-centered activity (role play, case studies, project work, research and investigation)
- Actively participates and takes responsibility for his/her 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 Activity.

Some active techniques that can be used in ICT

The teaching methods strongly emphasized in the Competence Based Curriculum (CBC) are active methods.

When a tutor is planning his/her lesson, he/she should establish criteria for performance and behavior changes at the beginning of a unit. Then at the of end of every unit, the tutor should ensure that all the student teachers have mastered the stated key unit competences basing on the criteria stated, before going to the next unit. The tutor will assess how well each learner masters both the subject and the generic competences described in the syllabus and from this, the tutor will gain a picture of the all-round progress of the learner. The tutor will use one or a combination of the following: Manipulation, Computer and task/practice, observation, pen and paper, and oral Answering

A.Computing activity

Many of the activities suggested in the ICT curriculum as well as in the student teacher's book are practical activity and projects.

Practical activities are mandatory in learning ICT; this method gives the learner the opportunity to implement a series of activities and leads to the development of both cognitive and hands-on skills.

A practical lesson is done in following stages:
- **Preparation:** Checking materials, computers and install required programs to ensure they are available and at good state; try the activity before the lesson; think of safety rules and give instructions to lab technician if you have any.
- **Performance:** Arrangement of student teachers and hand-on of individual student teacher. Preparing the next generation of experts in the field of ICT require student teacher to experience what they are learning; Let the student teachers perform and facilitate accordingly.
- **Debugging:** In ICT student teacher may not arrive at the desired output, inspire him/her to debug from his/her own work without starting from scratch where applicable.
- **Discussion:** Student teacher should discuss what they are doing and challenges they are facing. They should discuss also the implications of the results of their Activity.

In some cases, demonstration by the tutor is recommended when for example the activity requires the use of sophisticated materials or very expensive materials or when safety is a major factor like disassembling a laptop in laboratory and it needs specific skills to be learnt first.

In case your school does not have enough computers, activities and projects can be done in groups but make sure every student teacher participates.

B. Research work

Each learner or group of student teachers 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 forms and discussed in class.

C. Computer based project

ICT tutors are encouraged to sample and prepare project works and engage their Student teachers in, as many as possible. Student teachers in groups or individually, are engaged in a self-directed work for an extended period of time to investigate and respond to a complex answer, 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 student teachers 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. Student teachers may visit any computer related work or equipments in an institution around the school to satisfy their inquiries and curiosity when they engage in building websites and databases.

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 student teachers are involved in the learning process. Below are those main parts and their small steps:

1. Introduction

Introduction is a part where the tutor makes connection between the current and previous lesson through appropriate technique. The tutor opens short discussions to encourage student teachers think about the previous learning experience and connect it with the current instructional objective. The tutor 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 activity, presentation of learners' findings, exploitation, synthesis/summary and exercises/application activity, explained below:

- **Discovery activity**

Step 1:

- The tutor discusses convincingly with student teachers 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 tutor lets the student teachers work collaboratively on the task.
- During this period the tutor refrains to intervene directly on the knowledge
- He/she then monitors how the student teachers are progressing towards the knowledge to be learned and boost those who are still behind (but without communicating to them the knowledge).

- **Presentation of learners' productions**

- In this episode, the tutor invites representatives of groups to present the student teachers' productions/findings.
- After three/four or an acceptable number of presentations, the tutor decides to engage the class into exploitation of the student teachers' productions.

- **Exploitation of learner's productions**

- The tutor asks the student teachers to evaluate the productions: which ones are correct, incomplete or false
- Then the tutor judges the logic of the student teachers' products, corrects those which are false, completes those which are incomplete, and confirms those which are correct.

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

- The tutor summarizes the learned knowledge and gives examples which illustrate the learned content.

- **Exercises/Application Activity**

- Exercises of applying processes and products/objects related to learned unit/ sub-unit
- Exercises in real life contexts

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

3. Assessment

In this step the tutor asks some answers to assess achievement of instructional objective. During assessment activity, Student teachers work individually on the task/activity. The tutor avoids intervening directly. In fact, results from this assessment inform the tutor on next steps for the whole class and individuals. In some cases the tutor 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 N°	Lesson N°	Duration	Class size
2	x	ICT	Year 3	2	3/14	40 min	40 students

Type of Special Educational Needs to be catered for in this lesson and number of student teachers in each category	None of student teachers needs special educational needs

Unit title	INTRODUCTION TO WEB DESIGNING
Key Unit Competence:	Create a static website using HTML
Title of the lesson	Introduction and evolution of HTML
Instructional objectives	After observing images in Activity 2.4 and learn the lesson, student teachers will be able explain the evolution and importance of HTML
Plan for this Class (location: in / outside)	This class will be held in computer lab connected to internet and Student teachers will be organize in small groups
Learning Materials (for all student teachers)	Computers connected to internet, ICT student text book year 3.
References	ICT student text book year 3 and internet website: https://www.w3schools.com/html/html_intro.asp

Timing for each step	Teacher activity	Learner activity	Generic Competences and cross cutting issues to be addressed +a short explanation
Introduction **5 minutes.**	*The tutor facilitates student teacher to go in their respective groups. *Tutor asks some questions which helps Student teachers to discover the topic of the lesson.	*Student teachers respond appropriately to the questions asked by the teachers in review of the lesson. *Student teachers discuss about importance of HTML using internet.	. Communication . Cooperation . Critical thinking. .Gender through mixing boys and girls to do activity
Development of the lesson (Harmonization and summary) 10 minutes: Doing activity 5 minutes: Presentation 10 minutes: Doing application activity	-Tutor provides activity questions to discuss in pair using internet. -Tutor guides student teachers to do their activity - The tutor asks student teachers to present their findings and give additional comments to the student teachers 'work. -Tutor provides application Activity to student teachers. -Teacher comments on work of student teachers	- In groups, using internet Students teachers discuss on: • The importance of HTML • The evolution of HTML -Student teachers ask questions for clarifications while discussing in groups. - Students teacher present their findings. - Student teachers takes a summary from comments of a teacher.	Communication through presentations and discussing in groups. Cooperation when working together in groups **Cross cutting issues:** **Gender education:** Both boys and girls should participate in doing a research and discuss about evolution of HTML . **Financial education** Select an effective and efficient version of HTML which will help in designing a good and efficient website. Critical thinking and interpersonal cooperation

Conclusion (Assessment) 15 minutes	- The tutor concludes the lesson by asking questions to the learners, to know the achievement of the objective. - Provides a simple quiz	- Student teachers individually do application activity using shit of papers. -Doing a quiz in using their draft books and pens	
Teacher self-evaluation	To be completed by the tutor after the lesson		

UNIT 1

DATABASE CREATION AND MANIPULATION

1.1. Key unit competence:

Create, manipulate and query an access database

1.2. Prerequisite knowledge and skills:

Student teachers 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 is how cross cutting issues are addressed:

- **Standardization culture:** While learning Access, student teachers 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 student teachers discuss the cost implication involved in designing a new database and the financial benefits of having a database system.
- **Gender education:** Student teachers 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 sex not for only boys.

1.4. Guidance on the introductory activity

- The tutor organizes student teachers in groups of five in order to do the unit's introductory activity.
- The tutor asks student teachers to do the introductory activity in their respective groups.
- The tutor moves around to see how student teachers are working and provides guidance where it is needed.
- The tutor invites some groups to presents their findings to the class
- The tutor asks student teachers to evaluate the findings.
- The tutor tells student teachers 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 the backup of data, it is easier to do a full recovery of data in case of a failure.

1.5. List of lessons

#	Lesson title	Learning objective	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	2

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	3
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	3
10	Database normalization	Create an optimized database that has features a good database	2
11	Database project	Create a database system to solve a real life problem in the school environment	4
12	End unit assessment		1

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 student teachers and student teachers will need to have student teacher's book and computers with internet connectivity for doing research in order to understand different database concepts.

c) Prerequisites

Student teachers 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 tutor, student teachers explore how database approach came in place, what was the disadvantages of the old approach and the advantage of the new one.
- The tutor 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 teacher's book. Student teachers then give examples of databases that are used in their school environment or society.

e) Application activity 1.1

Answers:

Student teachers 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 teacher'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 teacher's book and computers with internet connectivity to facilitate research which is very necessary for understanding the database key terms

c) Prerequisites

Student teachers 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 student teachers who have done a research as instructed by the activity 1.2
  - Under the guidance of the tutor, Student teachers explain the different terms found in the database world
  - The tutor displays an access tables and Student teachers identify its different parts (rows, columns) and their other nominations
  - The tutor gives guidance on how to do application activity 1.2 and group Student teachers to do a research on NoSQL.

- **Answers of activity 1.2**

Explanation of the terms research can be got in the student teacher book. Student teachers do research to find advanced explanations. They also find other terms and explain them. Some of these terms can be found in the student teacher'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 teacher book. For answers that cannot be immediately found the tutor help learners 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:

Student teachers and the tutor will need to have the student teacher 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 student teachers 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 tutor presents the image in the activity 1.3 and asks the problems associated with it to which student teachers respond. This is going to serve as a motivational part of the lesson.
- Under the guidance of the tutor, student teachers discover the importance of defining data types in Access
- The tutor open Access and demonstrates the different data types available and guided by the tutor Student teachers brainstorm their uses.
- The tutor briefly explains to student teachers 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 teacher's book and computers with internet connectivity for doing additional research.

c) Prerequisites

Student teachers 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 2 student teachers
- In groups, students Student teachers start doing the activity 1.4
- In groups student teachers discuss the scenario in activity 1.4, present their findings and the whole class discuss on the findings.
- With the guidance of the tutor the class discuss the steps for database design and brainstorm what is done in each step
- As student teachers have now seen the steps of database design they evaluate their findings that they presented at the beginning of the lesson
- The tutor gives guidance on how to do the application activity 1.4

- ▪ **Answers of activity 1.4**

1. Student teachers 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 teacher book.

2. Student teachers 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 teacher 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 learner in the computer laboratory with Microsoft Office 2013 installed, projector for demonstrating examples, student teacher book and internet connectivity for doing researches.

c) Prerequisites

Student teachers 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 tutor, individually, student teachers read and answer questions in the activity 1.5
  - The tutor opens Access 2013 and try to show the different objects in it and explains their roles in an Access database
  - The tutor demonstrates how to create a database in Design, how to open and close a database and Student teachers 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 teacher discusses the importance of the primary key in each table. (all additional information are provided in student teacher book)

e) Application Activity 1.5

Answers:

1. Using the steps of database creation as they have seen them in the lesson, Student teachers create an Access database and save it on the desktop

2. In the created database "Marks", Student teachers 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:

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

c) Prerequisites

Student teachers 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 student teachers and making them search for the importance of establishing relationships in database tables.
  - For each kind of table relationship, the tutor narrates a story on which he/she then ask questions in order to make student teachers discover it
  - By questions and answers, student teachers give characteristics of each table relationship
  - The tutor shows the different types of diagrams used in an Entity Relationship Diagram
  - The tutor gives scenario of tables for which student teachers create ERD using the Chen notation
  - The tutor gives guidance on how to do application activity 1.6 in which Student teachers 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:
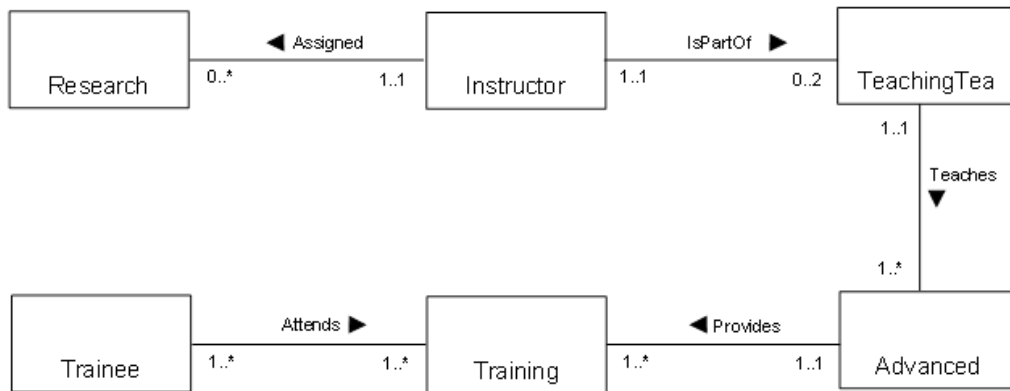
LESSON 7: Establishing table relationships in Access

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 teacher's book and internet connectivity for doing more research.

c) Prerequisites

Student teachers 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:

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

- Student teacher shows the Facebook to the rest of student teachers and tutor helps them to understand Facebook and Facebook usage.

▪ **Answers of activity 1.7**

Answer of the activity 1.7 are available in the student teacher book. Student teachers 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 is Excel does the data entry for the user.

2) Student teachers 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 teacher 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:

Student teachers will need computers in the computer lab with Office 2013 installed, projector for demonstrating examples to the class, student teacher'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

Student teachers 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 student teachers doing the activity 1.8
- With the guidance of the tutor, student teachers explain the terms like front end and backend
- Under the guidance of the tutor, student teachers open the library database in datasheet view and enter data from a hard copy

- Under the guidance of the tutor, student teachers create forms that they are going to use in entering data in the library database
- The tutor shows how to design a beautiful form for a database with logo, an interface for a database application
- The tutor 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 teacher book.

e) Application activity 1.8

Answers:

1.Student teachers create a student registration form. All steps to create such form are available in student teacher 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 teacher book, projector and internet connectivity for conducting research

- Computers in the computer lab with Microsoft Office 2013 installed
- Year III student teacher's book
- Internet connectivity for researching how queries are designed
- Projector for demonstrations to learners

c) Prerequisites
Student teachers 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:
- Student teachers brainstorm the meaning of queries and the role they play in a database

- Under the guidance of the tutor, student teachers recall the tables that compose the school library database, the columns in those tables, the data types, the primary and foreign keys.
- The tutor demonstrates the steps to follow in order to build a query in design view
- The tutor creates a design view query to run on one table, student teachers follow suit
- The tutor gives quick exercises of queries involving one table and student teachers create and run those queries
- The tutor presents to student teachers 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 tutor demonstrates how to create and run queries involving many tables
- Quick exercises to create queries on many tables are given and Student teachers create queries and run them
- As student teachers do exercises the tutor moves in the class to help those that may be having difficulties
- The tutor gives guidance on how to do application activity 1.9

▪ **Answers of activity 1.9**

1. a) Student teachers create the table which can keep the given data

b) Using MS Access, student teachers display Book title, Author, Publication Date, and value for the books in the category of science.

c) Using MS Access, student teachers 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

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:

STUDENTS
- *
- ⚷ StdID
- FirstName
- LastName
- SEX

Field:	StdID	FirstName	LastName	SEX
Table:	STUDENTS	STUDENTS	STUDENTS	STUDENTS
Sort:				
Show:	✓	✓	✓	✓
Criteria:		Like "U*"		
or:				

Sample output:

STUDENTS | Query1

StdID ▾	FirstName ▾	LastName ▾	SEX ▾
STU00001	Uwera	Esperance	Female
STU00006	Uwoniringiye	Judith	Female
STU00042	Uwayezu	J.	Male
STU00062	Uwihirwe	Jean	Male
STU00075	Uwizeye	Etienne	Male
STU00111	UBONABENSHI	JMV	Male
STU00159	UWANYIRIGIRA	JACQUELINE	Female
STU00185	Umurungi	Regine	Female
STU00188	Uwamurengey	Thamar	Male
STU00200	Uwiyaremye	Jean	Male
STU00203	Uwitonze	Philbert	Male

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

Query for displaying Mathematics books:

BOOKS
- *
- ⚷ BkNumber
- BkCategory
- BkTitle
- Author

Field:	BkNumber	BkCategory	BkTitle	Author
Table:	BOOKS	BOOKS	BOOKS	BOOKS
Sort:				
Show:	✓	✓	✓	
Criteria:		"mathematics"		
or:				

The sample output is here displayed:

Query1

BkNumb ▾	BkCatego ▾	BkTitle ▾	Author ▾
00006	Mathematic	Mathematics made	MUHAYIMPUNI
00011	Mathematic	Mathematics made	NIZEYIMANA E
00016	Mathematic	Mathematics made	IRIBAGIZA Féli(
00021	Mathematic	Mathematics made	NIYONSABA Jo
00026	Mathematic	Mathematics made	SIBOMANA Syl
00031	Mathematic	Mathematics made	AHISHAKIYE Be
00036	Mathematic	Mathematics made	INGABIRE Flori
00041	Mathematic	Mathematics made	MUKAMANZI V
00046	Mathematic	Mathematics made	NIYONZIMA Ol
00051	Mathematic	Mathematics made	ITANGISHAKA J
00056	Mathematic	Mathematics made	HAGENIMANA
00061	Mathematic	Mathematics made	KAMPIRE Carit:
00066	Mathematic	Mathematics made	INGABIRE Mari

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

Sample query:

STUDENTS
- *
- ⚷ StdID
- FirstName
- LastName
- SEX

COMBINATIONS
- *
- Combination
- StdID
- SchoolYear
- YearOfStudy

Field:	FirstName	LastName	Combination	SchoolYear
Table:	STUDENTS	STUDENTS	COMBINATIONS	COMBINATIONS
Sort:				
Show:	✓	✓	✓	✓
Criteria:			"MPC"	"2010"
or:				

Sample output of the query:

Query3

FirstNam ▾	LastName ▾	Combination ▾	SchoolY
Jean Baptist	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 teacher 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. Student teachers 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 teacher form groups and elect the group leader and start doing the activity 1.10
- The tutor 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 tutor student teachers brainstorm the problems that such a table in a database may cause
- Student teachers brainstorm what can be done in order to improve the presented table
- After explaining how a table is converted in 1NF student teachers convert the table in this form
- Student teachers 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 tutor the table is converted to the 2NF
- Under the guidance of the tutor student teachers identify the transitive dependency in the tables (if any) and convert them to the 3NF
- The tutor 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

Student teachers 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 tutor introduces the lesson by stating the objectives of the lesson
- With help of tutor, student teachers form groups
- Tutor explains student teachers which kinds of projects they are going to built
- Student teachers give ideas on what they expect to be able to do by the end of the lesson
- Under the guidance of the tutor, student teachers explain what is done in the investigation step
- The tutor explains the different techniques that are used in investigation
- Student teachers work on a project for Loan Management system and do practice on the investigation step
- The tutor explains the analysis step leaners do their practice using the Loan management system
- For the other steps (logical design and implementation), under the guidance of the tutor, student teachers explain what is done and the output got at the end of those steps.
- Student teachers 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 tutor instructs student teachers 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 student teachers 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:**
  - Student teachers prepare the room in which their projects are going to be presented.
  - If the room is big enough allow student teachers from other classes to participate or even tutors for other subjects
  - let student teachers 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 teacher's book. Those steps are: Investigation, Analysis, Logical design, Implementation and data entry. Explanations on each step are also available in the student teacher's book.

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

e) Application Activity 1.11
Answers:

Student teachers 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. Student teachers 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. Student teachers finally learn how to query the database they have created

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

The unit does not give all the details and only one example is given where examples are needed, as a tutor 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 leaners 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 tutor demonstrates to Student teachers 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, BorroweName-Assume that there is no borrowers having same name

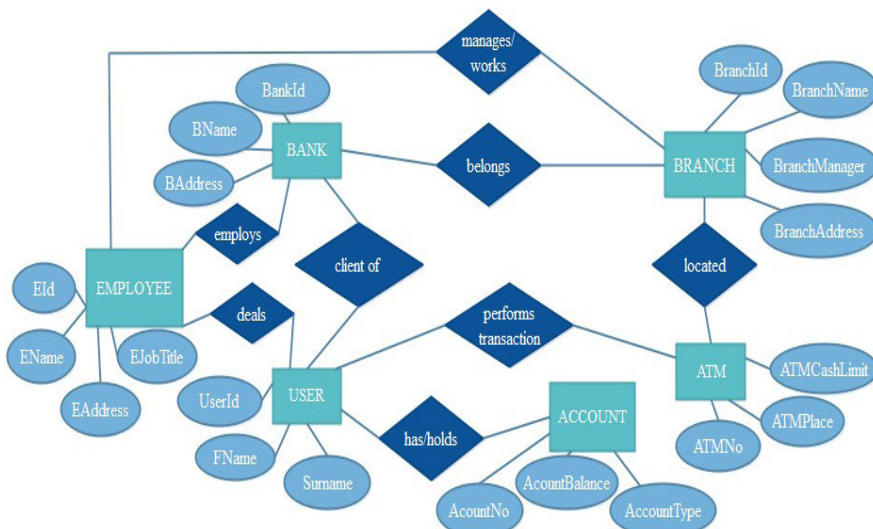iv) Relationship between BORROWERS and BOOKS is below:

ER Diagram
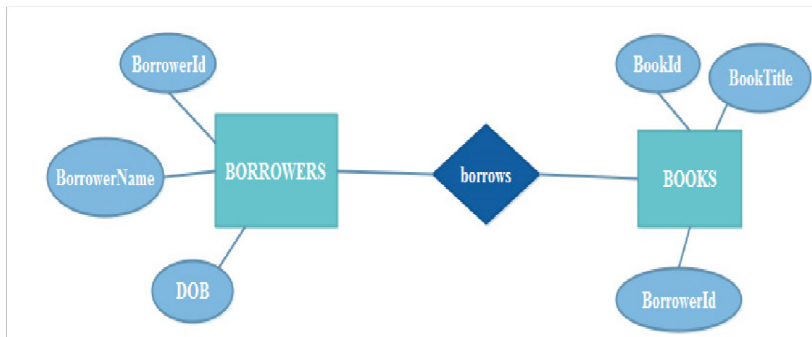
v) Yes, table BOOKS exhibits referential integrity. Because BorrowerId appears in BOOKS entity is foreign key from reference table BORROWERS.
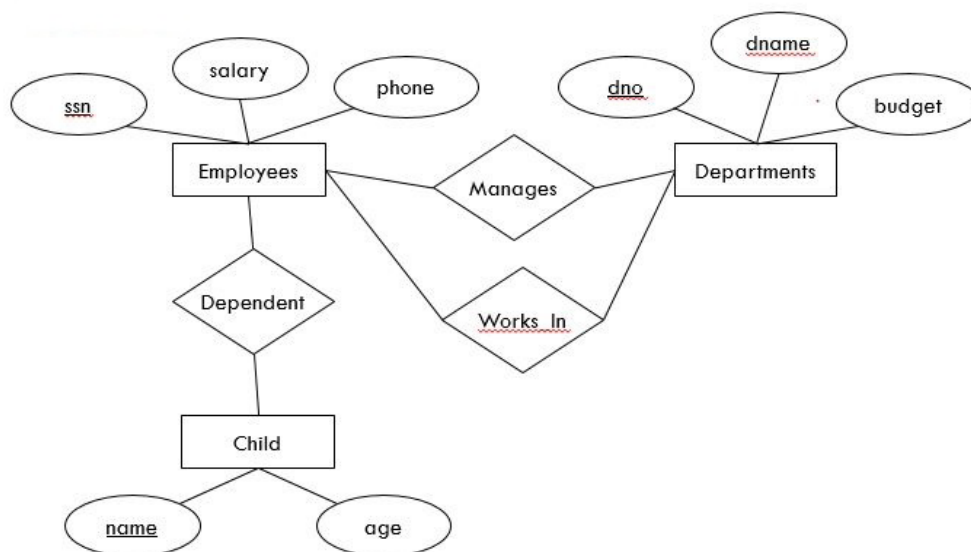
Question 2. Answer:

ER diagram for Banking System with 6 Entities

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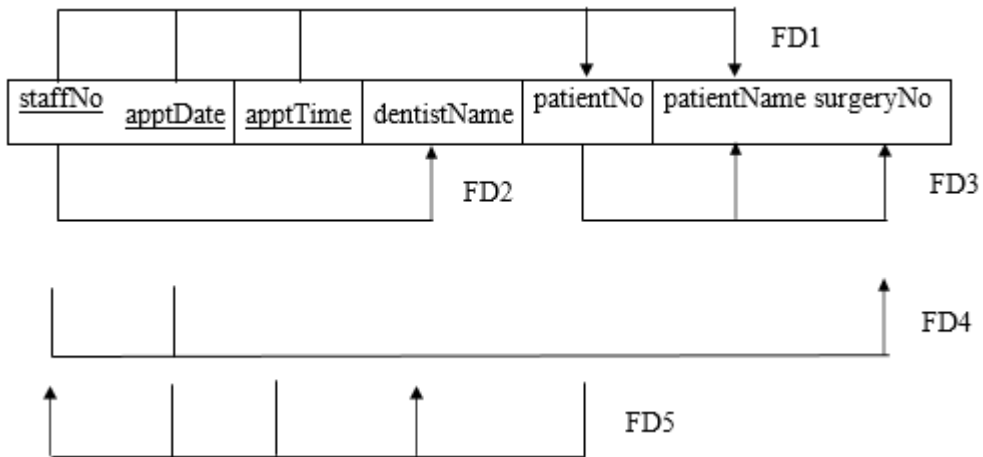
FD1 is already in 2NF. In this case, we can see that FD2 (just depend on staffNo) and FD4 (just depend on staffNo and apptDate) violate the 2NF. These two NFs are partially dependent on the candidate keys not the whole keys. FD2 can stand on its own by depending on the staffNo and meanwhile FD4 also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

staffNo	apptDate	apptTime	patientNo	patientName

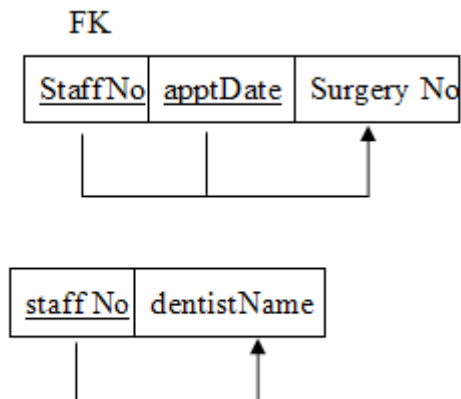| staffNo	apptDate	surgeryNo

staffNo	dentistName

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**.

FK

staffNo	apptDate	apptTime	patientNo

FK

StaffNo	apptDate	Surgery No

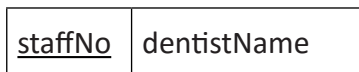| staff No	dentistName

StaffNo	apptDate	Surgery No

staff No	dentistName
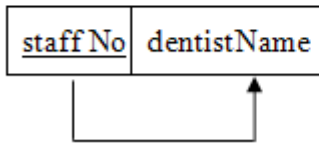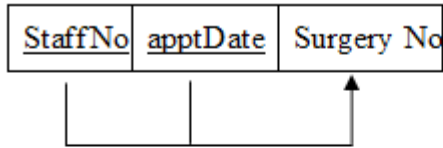
Let re-arrange and giving names to the tables.

staffNo	dentistName

Dentist(staffNo, dentistName)

FK

staffNo	apptDate	surgeryNo
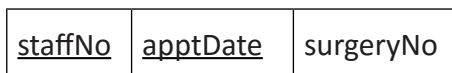
Surgery(staffNo, apptDate, surgeryNo)

patientNo	patientName
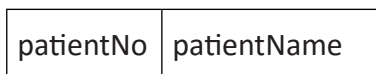
Patient(patientNo, patientName)

			FK
staffNo	apptDate	apptTime	patientNo
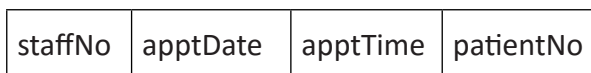
1.9. Additional Activity

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 Rehma	Customer Care	200000	6/24/2009	2/24/1983	Burundi	Bujumbura
105	NKUSI Anicet	Marketting 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 amount 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:	☑	☑	☑	☑	☑
Criteria:					<3000000
or:					

UNIT 2

INTRODUCTION TO WEB DESIGNING

2.1. Key unit competence:

Create static websites using HTML

2.2. Prerequisite knowledge and skills:

Student teachers 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 Year 1, Unit5: Searching the internet; Social media and Online Services learnt in Year 2, Unit 4: E commerce, social media and online services.

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 student teachers (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: Student teachers must be aware of cost related to website design and implementation while choosing web server to host a web site.

Peace and value education: Student teachers 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: Student teachers 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 student teachers can access the Internet) and each student must have a computer connected to the Internet where it is possible.
- The teacher instructs student teachers to go to page where the introductory activity is in the textbook.
- The tutor organizes student teachers into groups.
- Tutor let student teachers discuss about the photo observed
- The tutor asks student teachers to do the introductory activity in their respective groups.
- Tutor lets the students work independently on the activity.
- The tutor moves around to see how student teachers are working and provides guidance to needy groups
- The tutor invites representatives of groups to presents their findings
- The tutor asks student teachers to evaluate findings.
- The teacher tells the student teachers that in the fourteen coming lessons they will have complete answers.

Answer of introductory activity

1. Student teacher 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. Student teacher 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 can not 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
5. Here are the five elements to web design: content, usability, aesthetics, visibility, interaction.

2.5 List of lessons

#	Lesson title	Learning objective	Periods
1	Understanding of basic concepts	Explain the difference between website, web page, web application	2
2	Introduction and evolution of HTML	Explain what is HTML and its evolution.	1
3	HTML tags and syntax	Explain HML 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.	2
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	2
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	2
12	Creation of links	Appreciate the use of <a> tag that creates an hyperlink	1
13	Website creation project	Appreciate the creation of website project using HTML codes.	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

Student teachers are now familiar with using different search engines and internet programs like web browsers. As they learnt Unit 5 in year1 on; they can therefore apply the same reasoning in coming lessons.

d. Learning activity:

▪ **Guidance on activity 2.1**

- Tutor organizes Student teachers in groups in order to do activity.
- Student teachers elect the group leader and secretary.
- Tutor lets the students in groups work independently on the activity.
- Tutor walks around and sees if student teachers are doing activity in their respective groups.
- Student teachers react on the finding/ answers from other groups.
- Tutor 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 statistic and dynamic web pages refer to student teacher 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 made many changes to dynamic websites.
- **SEO (Search Engine Optimization) friendly Design:** Dynamic websites are SEO-friendly.

e. Answers of application activity 2.1

By guidance of the teacher, student teachers 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

Student teachers have already knowledge and skills about URL and its parts (protocol, host name, domain name, sub domain and search on the internet learnt in Year 1, Unit 5: 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 tutor instructs student teachers to go to page where the activity 2.3 is in the textbook.
  - The tutor organizes student teachers into groups.
  - Tutor let student teachers discuss questions of activity.
  - The tutor moves around to see how student teachers are working and provides guidance to needy groups
  - Tutor invites 2 or 3 group representatives to present their findings to the rest of class.
  - Tutor reacts on answers given by student teachers.
  - Based on the answers from student teachers, tutor 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 teacher text book

e. Answers of application activity 2.2

By guidance of the tutor, student teachers 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.
- XHML 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.

- **HTML 5** supports majority of browsers.
- **HTML5** doctype is a short statement
- **HTML5** comes with Media elements and new input elemens

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
Student teachers 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**
- Tutor organizes student teachers in groups in order to do activity.
- Tutor walks around and sees if student teachers are doing activity in their

respective groups

- Tutor lets student teachers discuss the syntax and the role of HTML tag.
- Tutor invites 2 or 3 group representatives to present their findings to the rest of class.
- Tutor reacts on answers given by student teachers.
- Based on the answers from Student teachers, tutor introduces the lesson.

▪ **Answer 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. Answers of application activity 2.3

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: <font color=" green "> 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

Student teachers 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

- Tutor groups student teachers into small groups so that they share ideas on questions asked in activity 2.4
- Tutor walks around the group to guide the groups and to make sure every member is participating
- In their respective groups, the student teachers 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 student teachers, a tutor introduces a lesson.

- **Answers of activity 2.4**

By guidance of the teacher, student teachers answer the question of activity 2.4. student teachers 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

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

d.Learning activity:

Guidance

- Tutor groups student teachers into small groups so that they share ideas on questions asked in activity 2.5
- Tutor walks around the group to guide the groups and to make sure every member is participating
- In their respective groups, the student teachers, 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 student teachers, a tutor introduces a lesson.

▪ **Answers of activity 2.5**

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

Visit the official Website of the Republic of Rwanda using the link below
The official Website of the Republic of Rwanda

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:

My name is: UWINEZA Francine

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

Student teachers are now familiar with HTML tags and page structures learnt in

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**

- Tutor groups Student teachers into small groups so that they share ideas on questions asked in activity 2.6
- Tutor walks around the group to guide the groups and to make sure every member is participating
- In their respective groups, the Student teachers, 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 student teachers, a tutor introduces a lesson.

▪ **Answers of activity 2.6**

By guidance of the tutor, Student teachers try to create and save the given HTML code and run it.

1. The output of given html code:
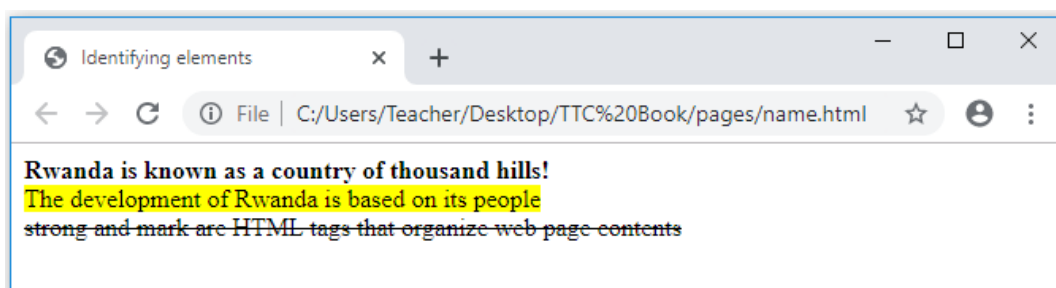
- The <strong> tag is used to separate the text from the rest of the content. Browsers traditionally bold the text found within the <strong> tag.
- The **<mark> tag** is one of the HTML5 elements. It marks a part of the text **which** has relevance. It can be used to highlight text for showing emphasis.
- The <del> 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 <font> and the HTML tag for inserting a picture is <img>

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>
<img src="pic.jpg" width =30%  height=30% alt="My own photo">
</center>
</body>
</html>
```

The output:

The following is a screenshot of a browser window titled "names" displaying the file C:/Users/Teacher/Desktop/TTC%20Book/pages/name.html:

1. PERSONAL IDENTIFICATION:

First Name: Theophile

Last Name: MUSERUKA

Date of birth: 29/7/1996

Martal Status: Single

Contact phone: 0783297650

2. ACADEMIC PROFILE:

Institution: University of Madras

3. CAREER ASPIRATION:

Information and Technology

3. The following is my own photo:
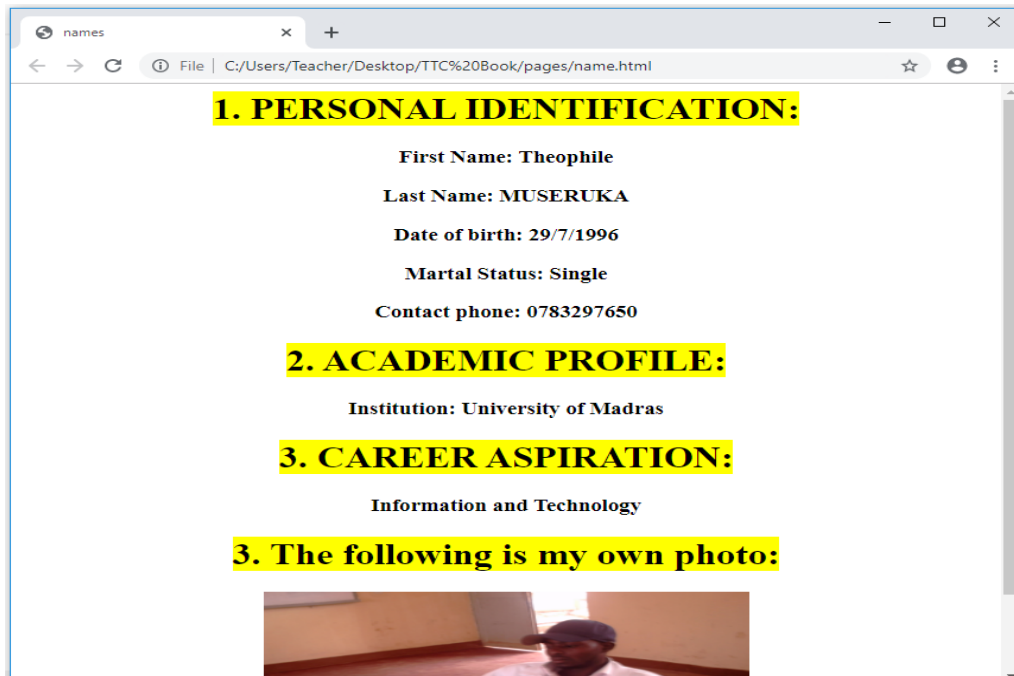
2. a. **Color attribute** sets a font color of a text

   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
Student teachers 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
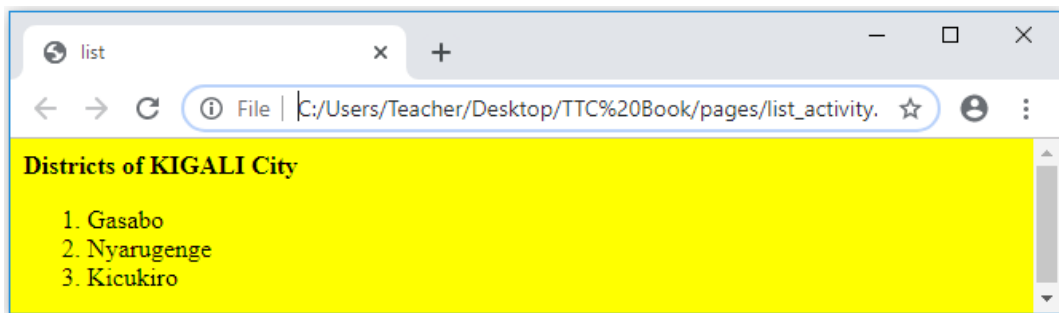
unordered list pages.

d. Learning activity:

Guidance:

- Tutor groups student teachers into small groups so that they share ideas on questions asked in activity 2.7
- Tutor walks around the group to guide the groups and to make sure every member is participating.
- In their respective groups, the student teachers, 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 student teachers, a tutor introduces a lesson.

▪ **Answers of activity 2.7**

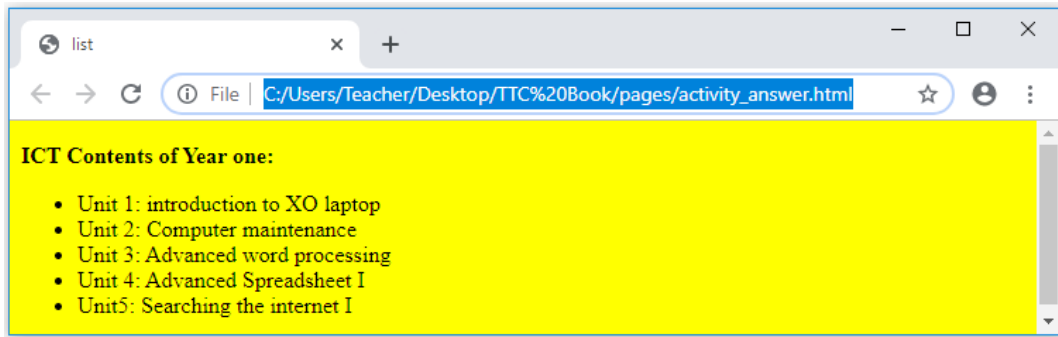1. Student teachers write code in HTML editor and save the given HTML code and run it.

Output of a given html code:

The web page content is organized in ordered list.

**e. Answers of application activity 2.7:**

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:
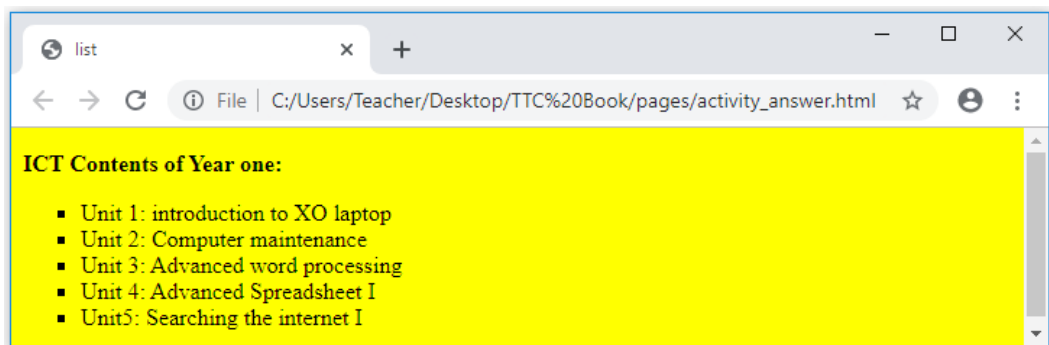
LESSON 8: HTML lists: Definition and Nested lists

a. Learning objectives

Appreciate the use of <dl> , and <ul> html tags which create definition and

nested lists web pages.

b. Teaching resources:

Computer lab with internet, textbooks to facilitate the research

c. Prerequisites

Student teachers 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**
  - Tutor groups student teachers into small groups so that they share ideas on questions asked in activity 2.8
  - Tutor walks around the group to guide the groups and to make sure every member is participating.
  - In their respective groups, the student teachers 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 student teachers, a tutor 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>
```

e. Answers of application activity 2.8

1. i   The difference between a definition list and nested list is that a definition list is a list which present a glossary of terms, or other lists like dictionary and encyclopedia. While a nested list is a list which has an entire structure of a list inside another list.

   ii   Below are html tag used into definition list

- <dt>...</dt> HTML tag that marks up the term
- <dd> ... </dd>   HTML tag that the definition part.

2. The HTML code that displays the given web page:

```
<!DOCTYPE html>
 <html>
<head>
 <title> Nested list</title>
</head>
<body bgcolor="yellow">
<p><strong><font color="purple"size="30"></strong></font></p>
<ol >
<li><strong>MINISTRY OF EDUCATION</strong></li>
<ul type="square">
 <li>Rwanda Education Board(REB)</li>
 <li>Workforce Development Authority (WDA) </li>
</ul>
 <li><strong>MINISTRY OF FINANCE AND ECONOMIC PLANNING
</strong></li>
 <ol type="i"><li>Rwanda Revenue Authority (RRA) </li>
<li>National Bank of Rwanda (BNR) </li>
</ol>
 <li><strong>MINISTRY OF LOCAL GOVERNMENT </strong></li>
 <ul type="circle"><li>Rwanda Broadcasting Agency(RBA) </li>
<li>National Identification Agency(NIDA) </li>
</ul>
 </ol>
 </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

Student teachers are now familiar with HTML tags that organize web page content

into any type of a list as learnt in lesson 8 and 6. Therefore, they can develop quickly the knowledge and skills about frames and table creation using HTML.

d. Learning activity:

- **Guidance**
  - Tutor groups student teachers into small groups so that they share ideas on questions of activity
  - Tutor walks around the group to guide the groups and to make sure every member is participating.-   In their respective groups, the Student teachers 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 student teachers, a tutor introduces a lesson.

- **Answers of activity 2.9**

With teacher guidance, student teachers 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

1. **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

2. 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:
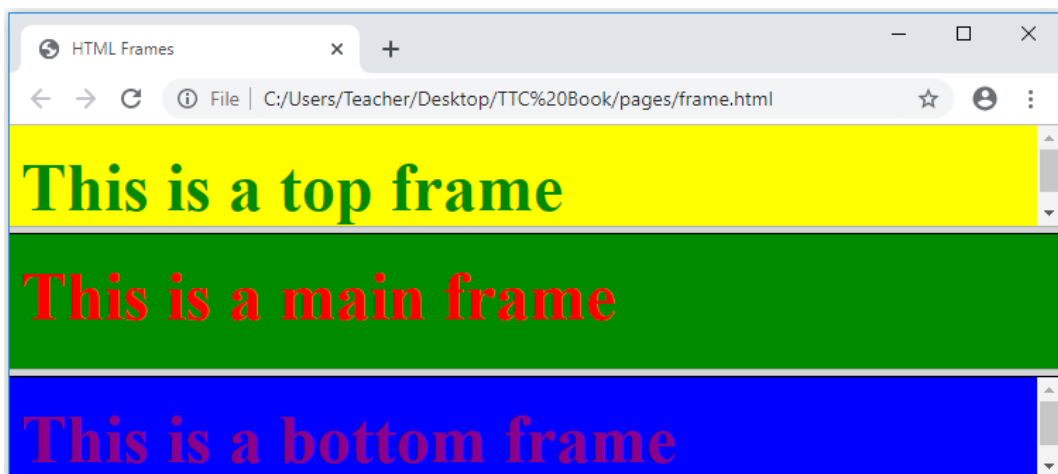
3. This html table page:

SAVE PARENTS'SCHOOL ADMINISTRATION STAFF

RegNo	Firstname	Lastname	Phone	Age	Position	Salary
			Employee's information			
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>
```

```
 <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
Student teachers 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
- Tutor groups student teachers into small groups so that they share ideas on questions of activity
- Tutor walks around the group to guide the groups and to make sure every member is participating.
- In their respective groups, the student teachers 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 student teachers, the tutor introduces a lesson.

▪ Answers of activity 2.10

With a guidance of a teacher, student teachers 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: [_____]

[SEND]

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 teacher 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:

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

Student teachers 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

- Tutor groups student teacher into small groups so that they share ideas on questions of activity
- Tutor walks around the group to guide the groups and to make sure every member is participating.
- In their respective groups, the Student teachers discuss on answers of activity.
- roup representative has to present their finding on the asked questions to the rest of the class
- With answers from student teachers, a tutor 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 <img/> element and name attribute in the anchor <a> element.

▪ **Bowser 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>
```
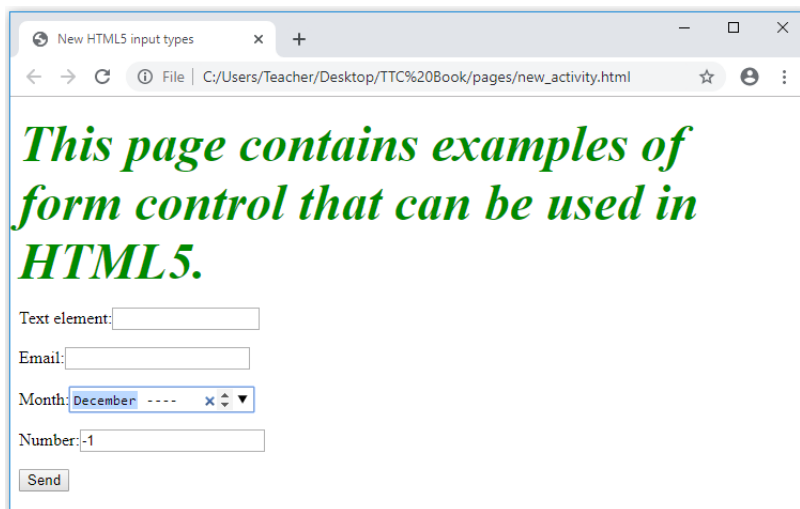
This html code displays the following:

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

Student teachers 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

- Student teachers in groups they discuss about questions of activity
- In their respective groups, the student teachers 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 student teachers, a tutor 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(i**nternal**) link (link to the same web site) is specified with a relative URL (without http://www....). While external links a web site to another ane.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 teacher text book lesson 12(Creation of links).

2. Refers student teacher 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:
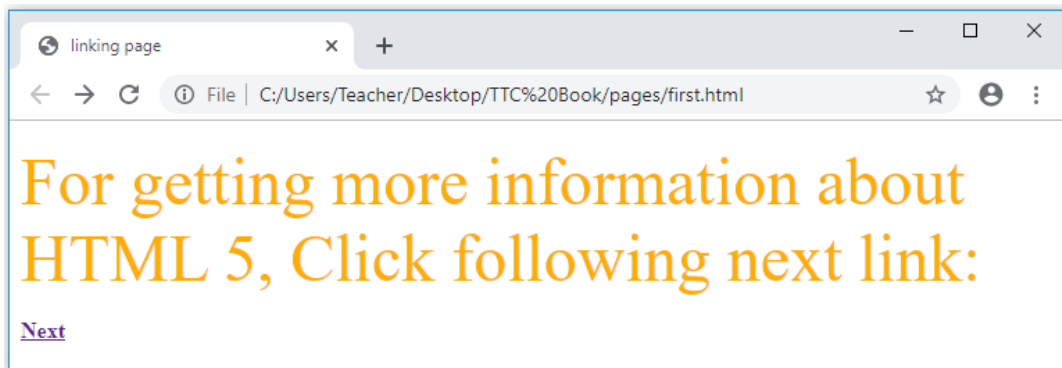
LESSON 13: Website creation project

a. Learning objectives
Appreciate the creation of website project using HTML codes.

b. Teaching resources:
Computer lab with internet, textbooks to facilitate the research

c. Prerequisites
Student teachers are now familiar with basic html tags that can create any page
and they have also skills about linking more than two pages. This will help them to
create their own website.

d. Learning Activity:

Guidance

- Tutor groups student teachers into small groups in order to do the activity 2.13
- Tutor walks around in the groups and guide the groups and to make sure every member is participating.
- In their respective groups, the Student teachers 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 student teachers, a tutor introduces a lesson.

▪ **Answers of activity 2.13**

Different phases involved in the web site design and development process are discussed in student text book.

e. Answers of application 2.13

1. While gathering information, you may consider: purpose, goal, target audience and content. Find their descriptions in student text book
2. Refer to the student teacher book to answer question 2
3. As web manager or developer, you need to solve the problems that come up time to time that customers are facing while using the developed system.

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 we 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 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:<ol>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.

1. Information Gathering
2. Planning
3. Design
4. Development

5. Testing and Delivery
6. Maintenance

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
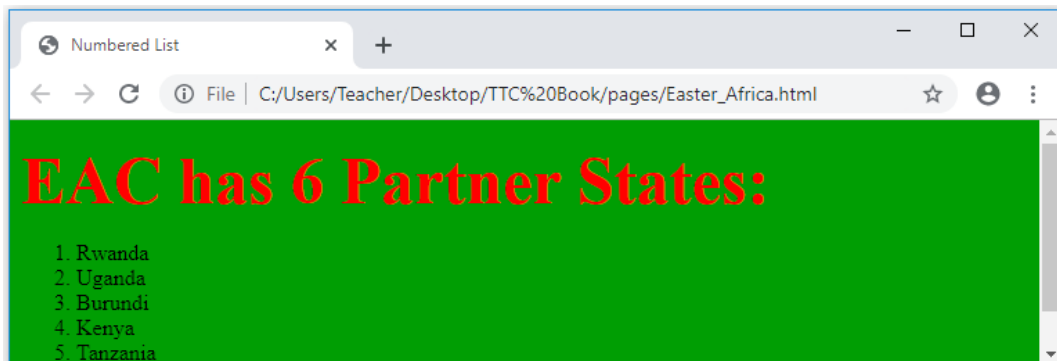3. Using the Red, Green, Blue (RGB) scheme e.g. "rgb(200,1,1)"

Example:

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 leson1: 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 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.

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>
<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>
</table>

7. Answer of this question is referred to lesson 11: HTML forms.

8. Answer of this question is referred to lesson 11: HTML forms.

9. Answer of this question is referred to lesson 11: HTML forms.

10. Difference between hyperlink and hypertext is found in a student text book lesson 13(Creation of links).

11. Three restrictions that were imposed by XHTML that have been relaxed in HTML5:

Attribute	Description
max	Specifies the maximum value for an input field
maxlength	Specifies the maximum number of character for an input Field
min	Specifies the minimum value for an input field
value	Specifies the default value for an input field

Examples:
- <input type="number" min=1 max=20>

- <input type="text" maxlength=12>

12. Find the answer in student text book lesson14: Website Creation Project

13. To build a static web site of a school, you have to pass through all steps of web site design and development process. From gathering initial information, to the creation of your web site, and finally to maintenance to keep your web site up to date and current.

Proceed the same way in which ITUZE Hotel Website was created. Refers to lesson 14: Website Creation Project

2.9 Additional activities

2.9.1. Remedial activity

1) What is the use of colspan and rowspan attributes?

Answer:

- The colspan attribute in HTML specifies the number of columns a cell should span. It allows the single table cell to span the width of more than one cell or column.
- The rowspan attribute in HTML specifies the number of rows a cell should span. 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

Answer:

- 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.

Answer:
```
<! 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>
```

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