



Botswana International University of S&T

Computer Science, College of Science

Activity: Project

Module Code	Comp 231
Module Description	Introduction Database Systems
Work	Project
Marks	100 (Final Grade will be 20% from the report and 80% demo) (Distribution may change as per lecturer's discretion)
Due Date	Last Week of Class
Instructor	Dr. Hlomani Hlomani
Teaching Assistant	Violet Lebogang
Method of Submission	<ul style="list-style-type: none">■ Submission link will be provided on Blackboard closer to submission■ Demo will be last week of class

Introduction

In this module students should have developed a critical and in-depth awareness of the theory, concepts, technology, practices, and professional issues related to database systems in a global context. They should have had lots of practical exercises, giving them the opportunity to explore a variety of database products with a particular focus on SQL Server since this was the chosen instructional Database Management System. The purpose of this project is to assess the student's grasp of the aforementioned. Students will work in groups to solve the given problem to simulate the work environment where they will be expected to work in teams. This will expose them to deal with issues such as group dynamics, differing work ethics, ethical consideration etc.

Case Study

Ideal farm management software are scares, when available they are expensive and are not developed with the small-scale farmer in mind. For all intents and purposes, the small-scale farmer here refers to one that keeps a maximum of 200 animals. These are farmers who most of the time keep free range animals that are mostly reared in communal grazing areas. The communal grazing way of keeping animals provides a cheap or affordable means for any farmer to keep their livestock – the farmer is rarely concerned about purchasing of feeds. It is cheap or affordable since for the most part the animals rely on grazing in the open veld and would only be supplemented (if any) as needed.

While the feeding seems to be taken care of, there are many other aspects of the animal management that presents a challenge to the farmers. The challenge that this document concerns itself with is that of data management and the analysis thereof. Example challenges that farmers have would include:

1. Vaccination Schedule management
 - a. Knowing which animal has been vaccinated with which vaccine.
 - b. Knowing which animal is due for which vaccine when.
2. Birth Records
 - a. Knowing which calf/kid/litter was born to which dam etc.
 - b. Record of birth dates
 - c. Record of gestation and expected births.
 - d. Record of deaths, their suspected causes
3. Incident reports
4. Animal inventory
 - a. Current animals
 - b. Disposed animals (including how disposed – sold, killed etc.)
 - c. Missing animals
5. Feed's inventory (including receiving, usage etc.)
6. Animal Transactions
 - a. Weaning
 - b. Disposal
 - c. Missing
 - d. Found

Your Task

1. List all the Business rules that are applicable to the scenario described above.
2. Use tools you have learnt in this course to design the database that solves the problem described above. As a guide use the following:

- a. Relationship table
 - b. Entity-Relationship Model: Develop a top-down design of the data in the form of an entity-relationship diagram using crow's foot notation. You should note all assumptions you make about the data and the reasoning behind your design choices. Also include any appropriate constraints and list of entity types showing their attributes and identifiers.
 - c. Normalize your database up to 3rd Normal Form: Once you are satisfied that the ER diagram is a good representation of the data, produce a logical design by mapping the ER to a set of **normalized** relations. Clearly show all intermediate steps.
3. Implement your final database using Microsoft SQL Server: Take each of the relations from your relational model and implement them in SQL Server using SQL commands – i.e. do not just create the tables using the Studio in design view. You must include all primary and foreign keys as well as any table or column constraints you deem appropriate. You must supply all SQL code in your report. You must also write insert statements to populate the database with sample data (make sure that these insert statements form part of the code files that you will submit along with your report)
4. Query your database: Using SQL, write a set of realistic sample queries based on the above scenario (**use your imagination for the details of the query**) but they should include the following SQL query techniques:
 - Joins (using two, three, or more tables)
 - Ordering
 - Grouping
 - Aggregate functions (MIN, MAX, AVG, COUNT, SUM)

You should aim to write a minimum of 15 sample queries ranging from basic SELECT...FROM...WHERE queries to more advanced ones using the above techniques. Your queries should be saved in your database instance and explained in your report.

Important Notes

- Makes sure that your full names and student IDs are on the front page of the assessment.
- Clearly label all tasks and make sure you explain all your technical work.
- For your design work (task 1 and 2) make sure your diagrams are clearly labeled
- For your implementation tasks (task 3 and 4) you must provide your SQL code listings.
- You must submit your written report in either PDF or Word format.
- All your SQL codes should be in clearly named separate files and zipped into one archive files that will be submitted along with your report.
- SO, YOU SUBMIT: a report, one zip file contains several SQL codes files
- YOU WILL OF COURSE DEMO YOUR PROJECT TO COMPLETE THE GRADE FOR THIS PROJECT