AFRICA UNIVERSITY
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"Investing in Africa's Future"

COLLEGE OF ENGINEERING AND APPLIED SCIENCES

NCIS 301: DATABASE SYSTEMS

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2024

LECTURER: MR BRAITON U MUKHALELA

TIME: 3 HOURS

INSTRUCTIONS

Create a folder on the desktop of your allocated computer into which you are to save all your work. The folder name should be your Student Reg Number- Course code eg **20001-NCIS301**

You are required to answer ALL questions as instructed in each section.

Use Invigilator Allocated Computer in one of the designated Computer Labs

The Examination is Lab based, no any other writing material is required.

Project Overview: Rabbitry Management Database

A Rabbit Farmer intends to maintain records for his rabbitry using a MySQL database engine. Candidates will be required to design an Entity-Relationship Diagram (ERD), normalize the database, implement the database schema, and perform maintenance and administrative tasks.

Section 1: Database Design (30 Marks)

Task:Use MySQL WorkBench to:

1. **Create an Entity-Relationship (ER) Diagram** for a rabbitry management system that includes the following entities:
    - **Rabbits:** Attributes may include RabbitID, Breed, Age, Weight, and HealthStatus.
    - **Breeding:** Attributes may include BreedingID, RabbitID (FK), MatingDate, and OffspringCount.
    - **Sales:** Attributes may include SaleID, RabbitID (FK), SaleDate, and SalePrice.
    - **Feed:** Attributes may include FeedID, FeedType, and Quantity.
    - **Health Records:** Attributes may include RecordID, RabbitID (FK), CheckupDate, and HealthNotes. **(15 Marks)**
2. **Normalize the Database** up to 3NF. Provide the table structures, including primary keys, foreign keys, and data types for each attribute. **(15 Marks)**

Section 2: SQL Implementation and Queries (40 Marks)

Task:Import the attached sql script from the desktop provided folder called Database Workfiles.

Using a pre-developed sample database for the rabbitry management system, execute the following SQL queries. Assume the database has been populated with sample data, if not please insert the relevant data so as to enable you run the Queries below.

1. Write a query to select all rabbits that are currently available for sale. (10 Marks)
2. Write a query to join the Breeding and Rabbits tables to find the breeding history of a specific rabbit. (10 Marks)
3. Use a subquery to find rabbits that have not been sold. (10 Marks)
4. Write a query to update the health status of a specific rabbit. (5 Marks)
5. Write a query to delete all health records that are older than two years. (5 Marks)
6. Write a query to calculate the total sale revenue from rabbits sold, grouped by breed.(10 Marks)

Section 3: Database Maintenance and Administration (30 Marks)

Task:

1. **Implement user roles and permissions** for the rabbitry database. Provide SQL commands for creating a user and assigning roles.

Username: UncleB

Role Assigned:Admin (root) **(5 Marks)**

2. Using a Report format discuss two strategies for optimizing query performance in your rabbitry database. Include examples of how these strategies can be applied.**(10 Marks)**
3. Using PPT file format, prepare a short presentation on how migrating from a SQL based platform like MySQL to a no-SQL platform like **Django** for the rabbitry database, including some commands for creating equivalent of tables in such databases. (10 Marks)

Submission Instructions

- All tasks should be completed in a single document.
- Submit your ER diagram as an image or PDF.
- Provide SQL queries in a .sql file format or in the document clearly labeled.
- Ensure all code is well-commented.

Grading Criteria

- **Accuracy:** Correctness of design and queries.
- **Completeness:** Coverage of all required tasks.
- **Clarity:** Well-organized presentation of diagrams and code.
- **Efficiency:** Use of best practices in SQL and database design.