ICT320

Database Programming

Task 2

Assessment and Submission Details

Marks: 30% of the Total Assessment for the Course

Due Date: Friday 11h59pm Week 13

Submit your assignment to the link under Assessment->Task 2 on Blackboard. The submission link will be open a week before the due date. Please follow the submission instructions provided.

The assignment will be marked out of a total of 100 marks and forms 30% of the total assessment for the course. **ALL** assignments will be checked for plagiarism by SafeAssign system provided by Blackboard automatically. **THIS IS AN INDIVIDUAL ASSIGNMENT; COLLABORATION AND DISCUSSION WITH PEERS IS NOT PERMITTED.**

Refer to your Course Outline or the Course Web Site for a copy of the "Student Misconduct, Plagiarism and Collusion" guidelines.

Assignment submission extensions will only be made using the official Faculty of Arts, Business & Law, University of the Sunshine Coast Guidelines.

Requests for an extension to an assignment **MUST** be made to the **course coordinator** prior to the date of submission and requests made on the day of submission or after the submission date will only be considered in exceptional circumstances.

Background

Dr. Celine Frere's research group is based at USC Sippy Downs and studies wild animal populations to understand how animals evolve and to improve their conservation outcomes. Although Dr. Frere has contributed to research on a variety of species throughout her career (from giraffes to porpoises), her research group focuses on three main species: koalas on Australia's east coast, eastern water dragons in Brisbane's Central Business District, and bottlenose dolphins in Shark Bay Western Australia.

The eastern water dragon project is one of the most important projects of Dr. Frere's research group. This project was established around Brisbane's CBD in 2010. These dragons are bigger and bolder than their non-urban counterparts. They are also diversifying at rates that allow for the study of evolution in action. Dragons in Brisbane city show significant levels of genetic divergence despite the small geographic distances between parks (<5 km), and significant differences in morphology (body size, head and limb shape and forelimb and hindlimb length) depending on the park they reside in. This project has shown that, like mammals, dragons have preferred associates or "friends", social dominance hierarchies, and even share avoidances. Each dragon in the Parkland is identified by a unique scale pattern around each eye. By studying the behaviour and social networks of these lizards over their lifespans and across generations, Dr. Frere's research group is able to investigate questions about the importance of sociality to health, reproductive success and evolution.

To learn more, go to https://www.celinefrerelab.com/eastern-water-dragons/ .

The Problem

Dr. Frere's research group has a huge database written and maintained in Microsoft Access that they wish to port to MySQL. Their database has thousands of records that cover information about the eastern water dragons such as description, morphology and when they were contacted. Their database has also a series of views to facilitate complex queries by the numerous researchers that work within Dr. Frere's research group.

Unfortunately, their database has only 2 tables. You will be given 2 excel spreadsheets representing those tables and a subset of their data, and a data dictionary for the table fields. **Your main task is to look at the spreadsheets and propose, justify and implement improvements to the database to make it more efficient.**

Your assignment is in two parts: Part A: Report, Part B: Code.

You are required to submit three files:

```
<student_Number>_<student_first_name_last_name>_ICT320_PartA.docx
```

```
<student_Number>_<student_first_name_last_name>_ICT320_PartB.sql
```

```
<student_Number>_<student_first_name_last_name>_ICT320_PartB.py
```

You are not to contact Dr. Frere's research group directly as this takes valuable resources away from field group. All client communication is to be directed through Course Coordinator Mr. Adriano da Silva Marinho.

Please note that all data is copyright and owned by Dr. Celine Frere's research group and or USC and is used with their permission for the purposes of this assignment. **Further distribution of this data is not permitted.**

For the data dictionary, please refer to the documents "User table and field descriptions.xlsx" and "Behavioural Surveys 2018.docx".

Submission Format and Requirements

For **Part A** you are to include an analysis of the current database design in a word document or PDF. You should include:

- Identification of major implementation flaws in the existing system, and/or areas for improvement, including (but not limited to)
  - Removing repeated data,
  - De-normalization for optimization
  - changing some areas to NoSQL (if so, include what type of NoSQL database).
  - Rational for the creation of each specific constraint (Foreign Key and Unique) and/or index.
- Identification of the current Normal Form of the system.
- An ER Diagram for the current design of the system, and an ER Diagram for the re-designed system.
- Your assumptions and any supplementary design requirements regarding the system.

For **Part B** you are to submit

- A single plain text file, named `<student_Number>_<student_first_name>_<student_last_name>_ICT320_PartB.sql`. In this file you are to include all the SQL for your database modification. This includes:
  - `ALTER/CREATE TABLE` statements for:
    - Changes proposed in your redesign from Part A
    - Commands for the missing `FOREIGN KEY`s, `INDEX`es and `UNIQUE`ness constraints.
  - `CREATE VIEW`s for
    - `Animals with 25 or more contacts and DNA:` you are to create a view that lists all the animals with 25 or more contacts and whether their DNA was gathered or not.
    - `Number of morphologies per animal:` you are to create a view that lists the number of morphologies for each animal.

- o CREATE PROCEDUREs for
  - Animal with the greatest number of contacts: You are to create a procedure that looks into the first view described above and returns, as an output parameter, the animal with the greatest number of contacts.
  - Animal with the greatest number of morphologies: You are to create a procedure that looks into the second view described above and returns, as an output parameter, the animal with the greatest number of morphologies.
  - o You need to test your database with some of the data provided to you. You are free to use any subset but make sure that the subset you use accounts for any constraints you created or assumed. PAY ATTENTION TO THE DATA DICTIONARY, THERE ARE LEGACY FIELDS THAT SHOULD BE INCLUDED IN YOUR DESIGN.
- A single plain text file named `<student_Number>_<student_first_name>_<student_last_name>_ICT320_PartB.py`. In this file you are to include the Python for your programming implementation. This includes:
  - o Calling and outputting as a single HTML page for each of the views (i.e. a SELECT * for both views)
  - o In the same HTML page, calling and outputting the results of the procedures
  - o Format the views as tables.

Submission

The completed assignment is to be submitted to Blackboard by the due date of *Friday 11h59pm Week 13.*

The assignment will be assessed according to the marking rubric. Late submission will be penalized according to the policy in the course outline. Please note Saturday and Sunday are included in the count of days late.