**CSCK542 Databases and Information Systems August 2024**

**Final Assignment:** **Database Connection Assignment**

**Due: October 7th 2024**

**1. Define the Roles:**

* **Database Designer/Engineer (**[**Yung Yu Wan**](https://liverpool-online-study.com/user/view.php?id=4439&course=2308)**- Cecilia)**: Responsible for creating the database schema, relationships, and normalization. They will design the Entity-Relationship Diagram (ERD) and implement the database in the chosen DBMS (e.g., MySQL)
* **Project Manager (Azhar Shaheer Badal)**: Oversees the project timeline, ensures deadlines are met, and coordinates group meetings. They will also ensure that the meeting minutes are maintained and that the group follows PEP-8 coding standards.
* **Software Engineer(**[**Jose Arturo Vega Lopez**](https://liverpool-online-study.com/user/view.php?id=4552&course=2308)**)**: Builds the Python-based interface for querying the database and ensures all required functionalities are implemented. He will oversee integrating the database into Python and writing the queries.
* **Tester(**[**Chit Wui Lam**](https://liverpool-online-study.com/user/view.php?id=4455&course=2308)**)**: Tests the database queries and Python code for bugs and ensures that the system meets the requirements. They can also write unit tests for Python code to ensure the quality of the system.
* **Video producer (** [**Tony Machado**](https://liverpool-online-study.com/user/view.php?id=4600&course=2308) **and others):** Assist with the powerpoint presentation building and video presentation.

**2. Database Schema Design([Yung Yu Wan](https://liverpool-online-study.com/user/view.php?id=4439&course=2308)):**

* Start by identifying the entities: Students, Lecturers, Non-Academic Staff, Courses, Departments, Programs, and Research Projects.
* Define the relationships between entities:
  + **Students** enroll in courses, are advised by lecturers, and register for student organizations.
  + **Lecturers** teach courses, advise students, and lead research groups.
  + **Non-Academic Staff** work in departments and support administrative tasks.
* Ensure you implement **many-to-many**, **one-to-many**, and **one-to-one** relationships where needed.
* Add attributes as necessary (e.g., adding "research interests" for lecturers or "disciplinary records" for students).

**3. ERD(** [**Yung Yu Wan**](https://liverpool-online-study.com/user/view.php?id=4439&course=2308)**):**

* Use a tool like **draw.io**, **Lucidchart**, or **MySQL Workbench** to create the ERD.
* Ensure normalization to at least 2NF (Second Normal Form) to avoid data redundancy.

**4. Populating the Database([Yung Yu Wan](https://liverpool-online-study.com/user/view.php?id=4439&course=2308)):**

* Generate dummy data for each table. This can be done manually or using a Python script with libraries like **Faker** to generate realistic data.
* Ensure that foreign key constraints are respected when populating related tables.

**5. Building the Python Interface (**[**Jose Arturo Vega Lopez**](https://liverpool-online-study.com/user/view.php?id=4552&course=2308)**):**

* Use **Python's sqlite3 or MySQL connector** library to connect to your database.
* Write Python scripts that allow users to query the database. These queries should include:
  1. **Find all students enrolled in a specific course taught by a particular lecturer.**
  2. **List all students with an average grade above 70% in their final year.**
  3. **Identify students who haven't registered for any courses in the current semester.**
  4. **Retrieve contact information for the faculty advisor of a specific student.**
  5. **Search for lecturers with expertise in a particular research area.**

**6. GitHub & Source Control (**[**Jose Arturo Vega Lopez**](https://liverpool-online-study.com/user/view.php?id=4552&course=2308) **& : Azhar Shaheer Badal):**

* Use **GitHub** to track progress. Ensure each group member has a branch for their work, and that regular commits are made to the repository.
* Conduct code reviews to ensure PEP-8 standards are followed.
* (**Azhar Shaheer Badal- edit the drescription page)**

**7. Testing the System (**[**Chit Wui Lam**](https://liverpool-online-study.com/user/view.php?id=4455&course=2308)**):**

* The **Tester** should write unit tests for the Python queries using **unittest or pytest**. Ensure the queries retrieve accurate results.
* Perform integration testing to check the interaction between the database and Python code.

**8. Report Writing (Azhar Shaheer Badal):**

* Document the database design, explaining the reasoning behind your schema, normalization process, and key relationships.
* Provide screenshots of the ERD, sample queries, and code.
* Ensure that meeting minutes are included as part of the submission.
* Write a 1000-1500 word report detailing the project's development, group roles, challenges faced, and the final outcome.

**9. Video Demonstration([Tony Machado](https://liverpool-online-study.com/user/view.php?id=4600&course=2308) and others):**

* Create a powerpoint presentation and present (e.g., database design, query execution, interface demonstration) the recordings into a single video.
* Ensure the video meets the technical requirements (resolution, file size).

**Suggested Timeline:**

* **Week 1-2**: Define roles, finalize the database schema, and set up the DBMS.
* **Week 2**: Populate the database with dummy data.
* **Week 3**: Build the Python interface and write the necessary queries.
* **Week 3:** Testing and debugging the system.
* **Week 4(Oct 1st-7th)**: Finalise the report, record the video, and prepare the submission.