CSC2001F, 2024 - GROUP ASSIGNMENT – DATABASE DESIGN

This assignment is to be done in groups of 5 students. **Only 1 member of each group must submit** you work. **Give all group members' student numbers *in alphabetical order* as the name of your submitted file**. Please use the Discussions forum for any questions, not email.

UCT Science needs a database for processing undergraduate applications to transfer from another faculty into a BSc. You are not to implement the system, only to design a database for it. It must keep student results in all courses going back 10 years. To ensure all data is available to check if applicants can be accepted [see *ScienceHandbook.pdf*, *BScTransfer.pdf*], it must also store: courses required in all BSc majors, all BSc course pre-/co-requisites, and lecture periods of all BSc courses.

1. Draw an ER (**entity-relationship) model**, using the notation from lectures, for as much of the above information as possible. Show as much of the semantics (details) as you can in your model. Explain any attribute names that may be unclear, and state any assumptions you made where you felt the specification is unclear. If necessary, motivate any unusual design decisions taken, and/or discuss any shortcomings of your model and why you were unable to remedy these. [6]

2. Give the **relation scheme** derived from your ER model: give each relation name with the names of its attributes in brackets, underlining the attributes of primary keys. [5]

3. Name any ONE **foreign key** attribute (e.g. Table.Colm) [1]

4. Give any ONE non-trivial **functional dependency** that applies to your attributes, and state briefly in simple English what it means. [2]

5. Give any example of an alteration to your database design that would mean it is **not in 2nd normal form**, and state briefly why this is so. [2]

6. Give any example of an alteration to your database design that would mean *it is in 2nd normal form* but is **not in 3rd normal form**, and state briefly why this is so. [2]

7. Give the SQL statement to create any ONE **view** of your data, and say why it is useful. [2]

8. State the **contribution of each member** (who worked on what). [1]

9. As the "**creativity**" part of this assignment, create a Java program that uses the database you've designed. [3]

10. Each member must separately complete the **quiz** indicating whether all group members should receive the same mark or not, with a reason for your answer. [1]