IE4791 Database Systems

Assignment (20%)

Database Design and Implementation

To avoid unnecessary reduction in marks, please read this file word by word. Questions are welcome, but it would waste time to repeat what is already explained here.

Assignment Group formation: Each Project Group may consist of **3** students **to 5** students, i.e., 2<S<6, where S is the number of students in a Project Group. You may form your own project group and elect a **group leader**. Each student must be in exactly ONE Project Group. Please do not request to have more than 5 students in a Project Group. You do not need to use NTULearn to form groups – you just need to state who are in your Project Group on page 1 of your assignment report. *If you are unable to form a group with others, please let me know by the end of Week 2 and I will do my best to form group for you.*

Database Design:

1. Propose a database case study or scenario. If your group has S students, your database should have at least (S + 3) tables. For example, a group with 3 students will need to have at least 6 tables in their database (including association tables). Write down the requirements on the database, i.e., database scenarios (see example scenarios in Tutorials. Avoid database jargons, such as entities and sub-types, in your scenario). Do not use exactly the same scenarios given in the lectures and tutorials of this course, i.e., Acorn Valley Furniture and Mountain View Community Hospital. It is alright to use other examples appeared in the lectures and tutorials, e.g., employees are assigned to projects, although you are encouraged to minimize the similarity between your database scenario with those covered in lectures and tutorials. More precisely, it would be unacceptable to have more than half of the entities/relationships in your database design the same as the entities/relationships in any 1 slide of the lecture notes or in any 1 tutorial question. While it is "acceptable" to have less than half of the entities/relationships in your database design the same as the entities/relationships in any 1 slide of the lecture notes or in any 1 tutorial question, between two assignments of the same quality otherwise, the less similar one is preferred. Please make a decision on what scenario to use based on the above and how you design your database, without asking the lecturer to evaluate your scenario/design, since this is an assessment.
2. Draw the ER diagram for your scenario.
3. Convert the ER diagram to a set of table structures (relations). If any tables are not in 3NF, normalize them to 3NF.

Database Implementation:

4. The requirements below are for Microsoft Access users. If you use database software other than Microsoft Access, do something equivalent.
5. Create the tables in Microsoft Access in Design View. Implement data integrity (default value, range values, etc). Add 5-10 fictitious records in each table.
6. In your Access file, generate at least (S + 1) Data Entry Forms (using Form Wizard, for entering data into tables), (S + 1) Queries (using Query Design View), and (S + 1) Access Reports (An "Access Report" or "database report" is something you create in Microsoft Access, but different from Access Tables, Access Queries, Access Forms, and "Assignment Report" below). Each Access Report should include individual information, itemized information, and aggregate information (for example, the patient information, various treatments, and total expense, as in Exercise **3d** in Week 2. Another example of a database report is Exercise 2 in Week 3, with student information, various courses, and CGPA).
7. To speed up data retrieval, would it make sense to create indexes? If so, create 2 indexes.

Overall Assignment Report:

8. Write an assignment report using Microsoft Word on your assignment in the following order (there are no requirements on the maximum or minimum number of pages or words):
    1. Title page: In a table, list all member names in your Project Group (the group leader first, followed by other group members in an alphabetical order). All names must be identical to those in matriculation cards (e.g., if your name is written on your matriculation card as "Chou Jielun Jay", do not write it as "Jay Chou" or "Jay Chou Jielun". Do not leave out or add any spaces in your name either. For example, if your name is written on your matriculation card as "Vijay Kumar", do not change it to "Vijaykumar"). Simple details like these would help tremendously in finding your name in the marking list. State clearly the contribution of each group member. Each group member may be tasked with different parts of the project but will be responsible to all parts of the project ("that part is not done by me" will not be a good excuse for an error).
    2. Requirements on your database (i.e., scenario for your database).
    3. ER diagram (You must use Microsoft Word drawing tools to draw your ER diagram – see example ER diagrams in tutorials and lecture notes. Do not include an image of your ER diagram drawn with other drawing tools, since the lecturers would not be able to verify whether you just scanned or downloaded the image somewhere. You may add Screen captures of relationships in Microsoft Access for the entire database; however, this does not replace the required Microsoft Word drawing of ER diagram).
    4. Table structures (3NF), or also known as relational model, including referential integrity and cardinalities.

5. Screen captures of all table designs (table design view), Screen captures of all tables with data. In all screen captures in your Assignment Report, make sure the characters in the screen captures are at least as large as 10-point in Microsoft Word (the character size in this paragraph is 12-point), for example, by zooming in, resizing the pictures, cropping away useless parts, etc.
6. Screen captures of all queries, including query design views and query results.
7. Screen captures of all forms for data entry (both form design view and data entry view).
8. Screen captures of all Access reports (both report design view and report results).
9. Screen captures of any indexes created.
10. Briefly explain what database integration is about. List three top challenges for DBMS teams to accomplish the task. Propose an approach as to how you can integrate another database into your current system. Briefly explain why your approach is cost effective and practical.

Important Notes:

Do not copy – both the "copiers" and "copyees" may be penalized. Do not discuss your scenarios etc. with other assignment groups.

The GUI (graphical user interface) of Microsoft Access is very intuitive. You can use Access tutorial online if needed
 http://www.quackit.com/microsoft_access/tutorial/

You may use DBMS other than Microsoft Access, e.g., MySQL (free); however, they are known to be less user-friendly and more programming intensive compared to Access. If you do not use Access, the above requirements related to Access may be replaced accordingly (screen captures in your written report are still required).

The lecturers will not be able to provide technical support for the software used. You may find necessary information from online help files, tutorials or discussion forum on the internet. This is also an excellent self-learning opportunity.

Instruction for submission of your assignment:

Put (1) the Word file of your written report and (2) the implemented Microsoft Access database file in a folder named with the name of the group leader as in matriculation card (If your name contains any characters not allowed in file names, delete these characters. If you use other DBMS, for example, MySQL, please submit all your program source files). Compress this folder into a single zip or rar file with the same name.

Login to NTULearn. Click your IE4791 -the LEC link, then click "Assignment", followed by "Project". Upload the single zip or rar file. You should then see a

"Download" button which lets you download the file that you have just uploaded. Download the file, open it, and verify your upload is successful. If you don't see a "Download" button or if your upload was unsuccessful, upload again immediately, until you have verified a successful upload. If you encounter any other problems when uploading your file to NTULearn, please contact NTULearn Help Desk to sort out the problem and then submit it to NTULearn.

Due to the large number of students, please do not request manual confirmation of your submission from your lecturer and do not email the file to the lecturer. Also, there is no need to inform the lecturer that you have submitted online.

Since this assignment is assessable, please do not ask the lecturer any questions specific to your assignment (e.g., is my ER correct? Are my tables correct?), although you are most welcome to ask any questions on the course, e.g., tutorial questions and examples in the lecture notes.

Submission Deadline: 25 March 2026 (precisely, by Wednesday, 11:59 pm Singapore time, Week 10). It is not recommended to submit at the last minute (please do not email the lecturer to explain that your submission is late because of network or system problems). It is wise to submit by the morning of the same day, at the latest, so that you can still try to find help from the CITS (NTU Computer Center) if you encounter system problems during submission. Each group can make multiple uploads before the submission deadline, but **only the group leader should upload** on behalf of the project group.

Late submissions: If a submission is late by less than 24 hours, 10% (of the assignment total mark 20) penalty will be imposed. Each additional 24 hours late will cause additional 10% penalty. If the penalty exceeds 50% for a submission, the submission will not be accepted (equivalent to 100% penalty).

All the best with the assignment!