CP2404 / CP5633 Database Modelling - Assignment #2

Note: This is an individual assignment. While it is expected that students will discuss their ideas with one another, students need to be aware of their responsibilities in ensuring that they do not deliberately or inadvertently plagiarize the work of others.

Assignment 2 – Database Implementation and Query Formulation

Due date: 5PM (AEST) Friday of Week 13 (Study Break Week), 5 June 2020

Assessment weight: 15%

Rationale

This assignment has been designed to give students experience using Structured Query Language (SQL) and other database management systems (DBMS) facilities to create/alter a relational database and to query the DBMS. This assignment addresses the following learning objectives for this subject:

- Develop and implement a database model using the E-R model and facilities provided by a DBMS
- Formulate queries using a database query language

This assignment consists of two main tasks:

1. Creating the database (by following three subtasks):
    - Create a relational database for a given conceptual model (ERD) using MySQL Workbench
    - Create a physical database model on MySQL Workbench by applying the forward engineer process
    - Import raw data from the external file to a table using the MySQL Workbench facility or using SQL queries
2. Writing SQL queries for given problems.

Further details about each task are presented in the following pages.

Submission

- An MySQL Workbench file containing the ERD you created (.mwb)
- A database dump file built and exported on MySQL Workbench (.sql)
- A WORD or text file containing all SQL query codes and result tables (.doc, .docx, or .txt)

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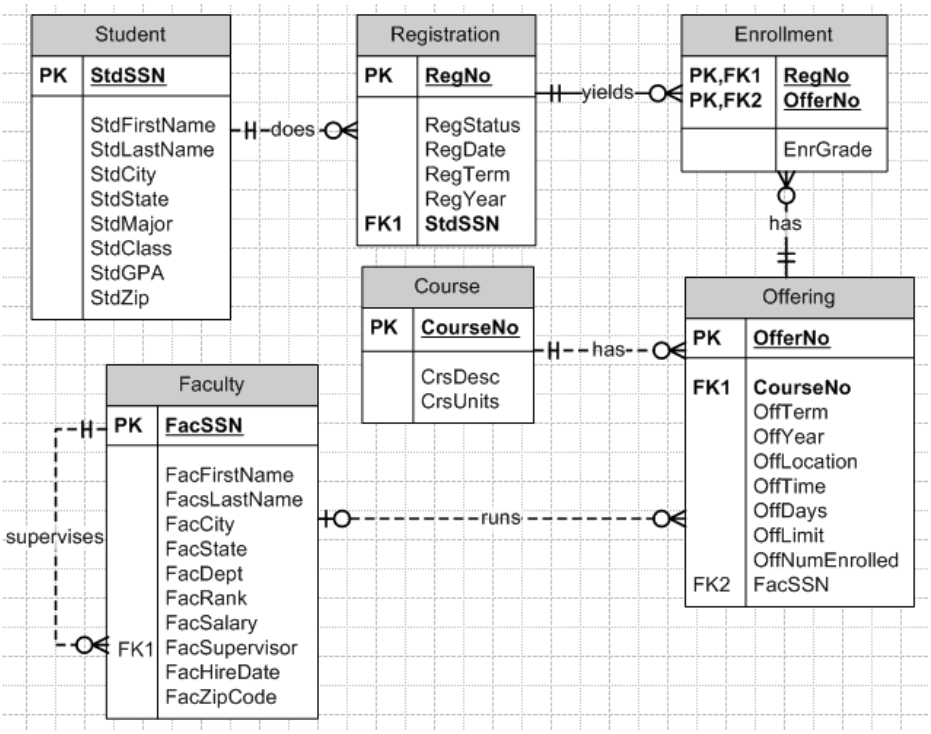
Task 1: Creating the database [42 marks]

1. Use MySQL Workbench to create an ERD to present a relational database model supplied as below. This is a sample ERD for a simplified University Enrolment Database.



- A faculty means an academic member who usually runs (teaches) courses (subjects).
- A course means a subject run by University
- A course is offered by the schedule set by University
- A student make a registration for each term by enrolling to a number of courses offered.

PKs should be correctly specified. All necessary attributes should be specified by setting appropriate data types and appropriate field lengths. **[Save the completed model as a uniEnrolDB.mwb file]**

The final ERD you create should correctly correspond with the ERD provided above in terms of structure, though the way to present components (PK or FK) in the ERD created using MySQL Workbench is not exactly same as what is presented in the ERD provided above

2. Create a physical database model using the forward engineering process on MySQL Workbench.

3. Insert the data (provided for this assignment) into the database. You may choose to use either the SQL INSERT syntax or the import facility provided by MySQL Workbench. (Caution: The name or order of attributes in the raw data files provided may not exactly match with those shown in the ERD. You will have to be careful to check it when you import data from Excel files to each table of your database)

4. Finally, dump the database into one integrated file on MySQL Workbench. **[Save the file as uniEnrolDB.sql file]**

Task 2: Creating queries [40 marks]

Using the database you constructed in Task 1, create the following SQL queries in MySQL Workbench.

For each question, the sample result table is provided to help you get an idea of what the table head and data format of your query result should look like.

Note:

This updated document shows the correct result expected by the correct query for each question. Please note that this result will be generated as it is, only if your database is developed correctly as specified in this assignment. If your database is not built up fully or incorrectly, the result may be different even if your SQL code is correct and ideal.

When your marker does marking on your SQL submission, the marker will test your code in their own correct database and also will assess your SQL codes by checking if the code has correct logic and syntax.

[Paste your SQL query into a Word document to submit. The final Word file should contain all SQL queries (Q1~Q20) you made for this task]

Notes:

- Queries should be written so that they would work with all reasonable sets of test data, not just that which has been supplied as a sample data.
- Marks may be deducted if your SQL is excessively (or unnecessarily) complicated.
- Full marks will be awarded where the solution provided is correct in all respects.
- Partial marks may be allocated where students are deemed to have provided a significant effort toward a correct result, but the solution contains some error.
- No marks are awarded where either no solution is provided, or the solution provided is deemed to be mostly incorrect.

1. Retrieve the name, city, and grade point average (GPA) of students with a high GPA (greater than or equal to 3.2). Save this query as **Q-1**.

StdFirstName	StdLastName	StdCity	StdGPA
CANDY	KENDALL	TACOMA	3.50
JOE	ESTRADA	SEATTLE	3.20
MARIAH	DODGE	SEATTLE	3.60
TESS	DODGE	REDMOND	3.30
CRISTOPHER	COLAN	SEATTLE	4.00
WILLIAM	PILGRIM	BOTHELL	3.80

2. List the name, city, and increased salary (increase the salary by 20 percent) of faculty hired after 1996. Save this query as **Q-2**.

FirstName	LastName	City	InflatedSalary	HireDate
NICKI	MACON	BELLEVUE	78000	4/11/1997
CRISTOPHER	COLAN	SEATTLE	48000	3/1/1999
JULIA	MILLS	SEATTLE	90000	3/15/2000

3. List the offering number and course number of Year 2006 offerings which had no instructor (faculty) assigned. Save this query as **Q-3**.

OfferNo	CourseNo
1111	IS320

4. List the offer number, course number, offer term, offer year and faculty Social Security number (SSN) for offerings scheduled in fall 2005 or spring 2006. Save this query as **Q-4**.

OfferNo	CourseNo	OffTerm	OffYear	FacSSN
1234	IS320	FALL	2005	098765432
3333	IS320	SPRING	2006	098765432
4321	IS320	FALL	2005	098765432
5679	IS480	SPRING	2006	876543210
7777	FIN480	SPRING	2006	765432109
9876	IS460	SPRING	2006	654321098

5. List the offering number, course number, and days of offerings containing the words "finance" or "database" in the course description (regardless of uppercase or lowercase letters) and taught in winter 2006. Save this query as **Q-5**.

OfferNo	CourseNo	OffDays
5555	FIN300	MW
5678	IS480	MW

6. List the offer number, course number, and full name of the instructor (faculty) of all FINANCE courses (the course number's prefix is 'FIN') offered in winter 2006 taught by professor. Note: professor's rank is "PROF" in the database. Save this query as **Q-6**.

OfferNo	CourseNo	Instructor Name
5555	FIN300	NICKI MACON

7. Summarize the number of offerings by course. Save this query as **Q-7**.

CourseNo	NumOfferings
FIN300	1
FIN450	1
FIN480	1
IS320	6
IS460	2
IS480	2

8. Summarize the average GPA of upper-division (junior or senior) students by major. Only list the majors with average GPA greater than 3.3. Save this query as **Q-8**.

StdMajor	AvgGPA
ACCT	3.5

9. Summarize the minimum and maximum GPA of students by major and class. Save this query as **Q-9**.

Major	Class	MinGPA	MaxGPA
IS	FR	3	3
FIN	JR	2.5	2.7
ACCT	JR	3.5	3.5
IS	SR	2.2	4
FIN	SR	3.2	3.2
IS	JR	3.6	3.6
ACCT	SO	3.3	3.3
IS	SO	3.8	3.8

10. Summarize the number of offerings run in 2006 by offering location. Save this query as **Q-10**.

OffLocation	2006OfferCount
BLM302	3
BLM214	1
BLM207	1
BLM412	1
BLM212	1
BLM305	1
BLM405	1
BLM307	1

Note:
The result table's head (column name) has been updated. Please use this column head names for your query

11. List a faculty Leonard Fibon's teaching schedule in spring 2006. List the offering number, course number, course description, days, location, and time. Save this query as **Q-11**.

OfferNo	CourseNo	CrsDesc	OffDays	OffLocation	OffTime
9876	IS460	SYSTEMS ANALYSIS	TTH	BLM307	1:30 PM

12. List a student Candy Kendall's course schedule in 2005. List the offering number, course number, days, location, time, and instructor's last name. Save this query as **Q-12**.

OfferNo	CourseNo	OffDays	OffLocation	OffTime	FacLastName
1234	IS320	MW	BLM302	10:30 AM	VINCE

13. List faculty members who have a lower salary than their supervisor. List the faculty member's name, the faculty member's salary and the supervisor's name, the supervisor's salary. Save this query as **Q-13**.

Subr.FacFirstName	Subr.FacLastName	Subr.FacSalary	Supr.FacFirstName	Supr.FacLastName	Supr.FacSalary
LEONARD	VINCE	35000	LEONARD	FIBON	70000
LEONARD	FIBON	70000	VICTORIA	EMMANUEL	120000
CRISTOPHER	COLAN	40000	LEONARD	FIBON	70000

14. List the names of faculty members and the course number for which the faculty member teaches the same course number as his or her supervisor in the same year. Save this query as **Q-14**.

Faculty Name	Year	CourseNo
LEONARD VINCE	2006	IS320
LEONARD FIBON	2006	IS320

15. List the course number, the offering number, and the average GPA of students enrolled. Only include courses offered in winter term in which the average GPA of enrolled students is greater than 3.0. Save this query as **Q-15**.

CourseNo	OfferNo	AvgGPA

(Using the sample data provided, no result is returned – this means there exists no offering which meets all conditions as requested)

16. For offerings beginning with IS in the associated course number, retrieve the offer number, the course number, the faculty number, and the faculty name. Include an offering in the result even if the faculty is not assigned. Save this query as **Q-16**.

OfferNo	CourseNo	faculty.FacSSN	FacFirstName	FacLastName
1111	IS320			
2222	IS460			
1234	IS320	098765432	LEONARD	VINCE
3333	IS320	098765432	LEONARD	VINCE
4321	IS320	098765432	LEONARD	VINCE
4444	IS320	543210987	VICTORIA	EMMANUEL
8888	IS320	654321098	LEONARD	FIBON
9876	IS460	654321098	LEONARD	FIBON
5679	IS480	876543210	CRISTOPHER	COLAN
5678	IS480	987654321	JULIA	MILLS

17. Retrieve the Social Security Number (SSN), name (first and last), rank, and salary of faculty who are also students. Save this query as **Q-17**.

SSN	FirstName	LastName	Rank	Salary
876543210	CRISTOPHER	COLAN	ASST	40000

18. List the Social Security Number (SSN), name and city of faculty who only teach in winter term 2006. Save this query as **Q-18**.

FacSSN	Name	FacCity
543210987	VICTORIA EMMANUEL	BOTHELL
987654321	JULIA MILLS	SEATTLE

19. List the course number, the course description, the number of offerings, and the average enrollment across offerings. Save this query as **Q-19**.

CourseNo	CrsDesc	NumOfferings	AvgEnroll
IS320	FUNDAMENTALS OF BUSINESS PROGRAMMING	3	4
IS460	SYSTEMS ANALYSIS	1	6
IS480	FUNDAMENTALS OF DATABASE MANAGEMENT	2	5

20. List the name of faculty who teach at least one offering of all of the 2006 information systems (IS) courses and his/her supervisor's name. Save this query as **Q-20**.

FacFirstName	FacLastName	Supervisor
LEONARD	VINCE	LEONARD FIBON
JULIA	MILLS	NICKI MACON
CRISTOPHER	COLAN	LEONARD FIBON
LEONARD	FIBON	VICTORIA EMMANUEL

Assignment #2 Database implementation and query formulation: Marking criteria

Requirement	Criteria	Marks
Task 1: Creating the database	**Create/Save ERD correctly as required in Workbench (.mwb file)** All tables required are correctly created/presented (in ERD), with: • correct attributes (1 marks for each table) • correct PKs (1 mark for each table) • Relationships are constructed correctly (1 mark for each relationship)	___/18
	Develop physical database having all tables required are correctly created, with: • correct attributes (1 mark for each table) • correct PKs (1 mark for each table) • data added correctly (1 mark for each table) • correct relationships made between tables (1 mark for each relationship)	___/24
Task 2: Creating queries	Queries produce the correct results with correct logic	___/40 (2 marks for each query)
	Total Marks	___/82