## 

## Web and database design individual project

**Key Information**

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| Released | Week 7: Wednesday 8th November 2023 |
| Deadline | Week 12: Wednesday, 03 January 2024 at 16:00 |
| Deliverables | Report (PDF); db\_setup and SQL\_queries (SQL); ZIP folder with web files |
| Submission | SurreyLearn Coursework folder (under Assignments) |
| Weighting | 70% of final module grade\* |
| Academic Misconduct | Coursework will be routinely checked for academic misconduct. Your submission must be your own work. Please revisit the academic integrity slides and regulations ensure that you know what this means. Do not give your work to anyone else, either before or after the coursework submission deadline. |

\*Note: The marks are out of 100 in the descriptor but the final mark will be out of 70, the test is 30%

## Introduction

This coursework is individual work and will assess your independent capability of modelling, designing and implementing a small relational database with a basic web front end.

###### Scenario

You have been asked to develop a website with a database backend for a university student society or club that interests you. You can look at University of Surrey's clubs and societies as well as the sports clubs at the Surrey Sports Park. You do not need to pick one of these - you can come up with your own idea for a club but it has to be a university club. Alternatively, you can design a database that stores the basic details of clubs and societies without going into details of activities and events. The university would also like to keep data on students' hobbies so they can suggest appropriate clubs and societies that students might be interested in joining.

You will get experience in the following:

* Eliciting appropriate business rules
* (Enhanced) Entity Relationship (EER) data modelling
* EER to Relational Schema Mapping
* Implementing tables and querying data using SQL
* Accessing data stored in a MySQL relational database using NodeJS
* Creating a web interface to the database using front-end technologies such as HTML and CSS.

The coursework is in two parts: Part 1 covers database design and implementation and Part 2 covers web development.

## Part 1: Database Design and Implementation [65 Marks]

An EERD starting diagram with a course entity type and student specialisation hierarchy is provided to you as a starting point. You **must use** this and build on this for your scenario. You are provided with the following files:

1. [coursework-EERD.drawio](file:////content/enforced/252843-COM1025_2023-4_SEMR1_1/Coursework/coursework-EERD.drawio%3fisCourseFile=true) (This has the course entity type and student specialisation hierarchy)
2. [db\_setup.sql](file:////content/enforced/252843-COM1025_2023-4_SEMR1_1/Coursework/db_setup.sql%3fisCourseFile=true) (This has the SQL DDL and INSERT statements )
3. [SQL\_queries.sql](file:////content/enforced/252843-COM1025_2023-4_SEMR1_1/Coursework/SQL_queries.sql%3fisCourseFile=true) (This is for the SQL queries)
4. [COM1025-Coursework\_template.docx](file:////content/enforced/252843-COM1025_2023-4_SEMR1_1/Coursework/COM1025-Coursework_template.docx%3fisCourseFile=true)  (This is a brief template for the report)

Mark Breakdown for different Tasks

Task

Title

Mark

 Deliverable:

T1

Business Rules

5

COM1025\_coursework.pdf

T2

EER Modelling

12.5

COM1025\_coursework.pdf

T3

EERM to relational schema

10

COM1025\_coursework.pdf

T4

SQL Data Definition

7.5

db\_setup.sql

T5

SQL Data Manipulation

10

SQL\_queries.sql

T6

Extra challenge task

15

COM1025\_coursework.pdf and other files depending on the task

Other

Digital skills and report writing

5

 Quality of presentation of COM1025\_coursework.pdf

TOTAL Marks

65

##### 1. Business Rules [5 marks]

The business rules should describe ALL the EER Model entities and relationships, the more complicated attributes, including a multivalued attribute, and any constraints. You are given the business rules for the course entity and student specialisation hierarchy as well as for an entity Hobby in the report template.

These go in **Section 1** of the report COM1025\_coursework.doc

##### 2. EER Modelling [12.5 marks]

Apart from the course entity type and student specialisation hierarchy given to you in the starting EERD, you need to identify at **least two other** entity types with appropriate attributes. These entities should not be associative or weak entities. You can have an additional 1 to 2 entities if you want to. You should have one multivalued attribute. Relationships between the entities should show all the appropriate constraints.

You need to draw the Hobby entity based on the business rules given to you in COM1025\_coursework.doc

2.1 Two entities with appropriate attributes (one multivalued)  [5 marks]

2.2 Two binary relationships at least one being one-to-many    [5 marks]

2.2 Entity Hobby based on the business rules given to you        [2.5 marks]

The EER diagram must be drawn following the crows-foot notation taught in this module and you can use any diagram drawing software tool to create your notation-compatible EER diagram (e.g. diagrams.net). You are provided with a drawio file that contains the student specialisation hierarchy you must use. If you decide to use some other software then you will have to re-draw the hierarchy.

After you are done with your modelling save the drawio file and then export it as an image (PNG).

Include this Image in **Section 2** of the report COM1025\_coursework.doc

##### 3. EER Model to Relational Schema [10 marks]

The next step is to translate your ER Model to a relational schema using the appropriate mapping algorithms. You will need to translate the entity Hobby and the two entities you identified in section 2. You do not have to translate the whole ER Model if you did additional work to gain more marks for the extra challenge task.

3.1 Translating Many-to-Many relationship between Student and Hobby [4 marks]

3.2 Translating a one-to-many binary relationship                                     [2 marks]

3.3 Translating one other binary relationship                                              [2 marks]

3.4 Translating the multivalued attribute                                                     [2 marks]

These go in **Section 3** of the report COM1025\_coursework.doc

##### 4. SQL Data Definition Language [7.5 Marks]

The third step is to create the tables using SQL and populate them with data. You don’t have to implement all the relations – Course and student have already been provided so you need to create at least two other tables from the new entities you came up with and load them with data. Remember that all the tables in your database should be linked with foreign keys such that you can write the queries specified below in section 5.

4.1 Two SQL table definitions with keys and constraints shown  [6 marks]

4.2 INSERT data statements                                                          [1.5 marks]

These go in the **db\_setup.sql** file.

##### 5. SQL Data Manipulation Language [10 marks]

In this part you will write three queries to query the data in your database. Please write comments for what the query does otherwise you will lose marks.

5.1 One SELECT statement using GROUP BY or/and an aggregate function   [2 Marks]

5.2 One statement with a subquery                                                                  [3 Marks]

5.3 One statement with a JOIN                                                                         [3 Marks]

5.4 Either the subquery or the JOIN should use three tables                           [2 Marks]

These go in the **SQL\_queries.sql** file.

##### 6. Extra Challenge/Advanced Task [15 marks]

For this section you can pick what you enjoy doing that is more challenging to gain these marks.

You can do some more EER modelling e.g. another specialisation hierarchy and translate it correctly or a ternary relationship and translate it correctly. A very relevant m-n relationship translated correctly will also gain you some marks.

If you prefer coding you can also write some challenging SQL queries as well as use extra constraints and indexing.

Please clearly indicate in **section 5** of the report what extra work you did.

##### 7. Digital Skills [5 marks]

In this section you will get marks for your presentation and report writing skills.

Please delete the explanations in italics I have put in the report - they are there for your guidance only. Also you can use another template that is more appealing as long as you keep the same section titles and the amount of space provided for each section stays the same. Think of how you format and structure the report. **You are not allowed to go over the page limit of 6** (not counting front page or Appendix).

### Submission

Three Deliverables uploaded to SurreyLearn (found under Assessments -> Assignments).

1.  db\_setup.sql (This has the SQL DDL and INSERT statements )

2.  SQL\_queries.sql

3. COM1025\_coursework.pdf

###### Important

Remember to convert your word doc to pdf. Check your pdf to make sure it is not corrupted before uploading it.

## Part 2 Web Frontend to Database [35 Marks]

This part will be released week 8.

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