COM1025: Web and Database Systems

COURSEWORK

Database Design Project

This coursework will assess your understanding of the key techniques taught in the second half of this module based on a University Accommodation Office or University Library scenario:

- Enhanced Entity Relationship (EER) data modelling
- Relational databases and EER to Relational Schema Mapping
- Implementing tables and querying using MySQL
- Accessing data stored in a MySQL relational database via a website using PHP.

It will count towards **60%** of your total module mark

Introductory Guidelines

This coursework is **individual work** and the focus is to test your **independent capability** of modelling data, designing and implementing a relational database, and using PHP to create a dynamic webpage based on the MySQL relational database.

Please read the following guidelines very carefully:

When you need to Submit

Coursework Released:	Friday, Week 7 (November 13th 2020)
Deadline for Submission:	Wednesday, Week 12 (January 6th 2021), 4:00pm

Where you need to Submit

- You should submit your work to **SurreyLearn** in the right submission folder (the second one for Coursework).

- If you have any technical problem submitting to SurreyLearn, you should try to submit via email before the above deadline.
- If you submit via SurreyLearn, please always double check after submission to make sure your submission has indeed been uploaded to the system without any error.

What you need to Submit

You need to submit the 3 files listed below as 3 separate items by the deadline. The tasks you need to do and what you need to submit in each of the 3 files is described in detail in the following sections.

	File Name	File Description
1	COM1025_CW_URN.sql	This file should be a .sql text file. It should contain ALL the SQL statements you used for the coursework.
2	COM1025_CW_URN_website.zip	This is a zip folder. It should contain all the source code and files you used to create your website (PHP and HTML files)
3	COM1025_CW_URN.pdf	This is a PDF document. It is a short description of your design – please see section 5.

IMPORTANT: URN should be replaced by your personal University of Surrey URN

Extensions, Late Submissions and Academic Integrity:

Coursework will be routinely checked for academic misconduct:

- Please refer to your Student Handbook and the advice given on SurreyLearn on plagiarism and collusion and make sure that you understand the regulations.
- If you are in any doubt, please seek advice from your Module Leader or Personal Tutor.

Students are reminded of the University policy on late submission of coursework as outlined in the Student Handbook:

- 10 percentage points penalty per 24 hours for a maximum period of 48 hours
- You will get a Zero mark if you submit after the 48 hours (no submission will be allowed after the deadline + 2 days (48 hours)).

If you need to apply for Extenuating Circumstances, please read your Student Handbook or check SurreyLearn for the policy for mitigating or extenuating circumstances (ECs).

Coursework Mark Distribution

The 100 marks of this coursework are distributed to different marking items as follows:

MARKING ITEM		Basic Marks	Additional Marks
Technical Parts	**Task 1**: EER data model/diagram (as shown in the report)	20	5
	Task 2: Conceptual/Logical relational database schema (as shown in the report)	15	5
	Task 3: MySQL code (content of the .sql file submitted plus any technical description of your MySQL code in the report)	15	5
	Task 4: PHP code bridging MySQL and your web pages (Other source of your website will NOT carry marks!)	15	5
Written Report (non-technical part)		15	0
TOTAL		80	20

The coursework awards basic marks (80%) for attempting the explicitly listed requirements. An additional 20% can be gained for attempting anything more technically complicated or advanced then the basic tasks. An example of an advanced task is given for each task but the amount of additional marks for any advanced task will be determined on a case-by-case basis.

Coursework Tasks/Deliverables

You need to choose ONE of the following options (A or B) for your database design project:

A) A University Accommodation Office Database

Have a look at the University's accommodation office website. If you are staying in University accommodation, then you can also study the application form.

B) A University Library Database

Have a look at the University Library's website.

Task 1: Extended Entity-Relationship Modelling

As the first step of your course work, you should create an EER model to represent the data of the coursework topic you selected (A or B).

To attain all the basic marks, the EER Diagram should show the following:

1. At least one supertype and two subtypes
2. at least two additional entity types (apart from the supertype and subtypes in the first requirement), which are **not** an associative or weak entity.
3. at least two (binary) relationships with at least one relationship being one-to-many
4. the appropriate attributes for the entity types with at least one multi-valued attribute in one of the entity types

Task 1	Description of tasks	Mark
	BASIC REQUIREMENTS – 20 Marks	
1.1	One supertype and two subtypes correctly represented with the disjointness and participation constraints	5
1.2	Two additional entities	2
1.3	Relationships a) One-to-Many relationship b) Any other binary relationship All the relationships should show the connectivity (cardinality) and participation constraints	4 4
1.4	Attributes (for all 5 entities) including one multivalued attribute	5
	ADDITIONAL WORK – 5 Marks	
1.5	Create a more complicated EER Diagram with additional entity types and relationships (or e.g. unary, ternary relationships)	5
	TOTAL MARKS	25

SUBMISSION: as an EER Diagram in the report: COM1025_CW_URN.pdf

The EER diagram must be drawn following the notations taught in this module and as indicated in the report template, and not those used by software tools like MySQL Workbench or phpMyAdmin. You can use any diagram drawing software tool to create your notation-compatible EER diagram (E.g. diagrams.net or PowerPoint). The EER Diagram, with a description of the business rules and any assumptions you make should be in the appropriate section of the written report.

Task 2: Mapping the EER Model to a Relational Schema

The next step is to translate your ER Model to a relational schema using the appropriate mapping algorithms. You will need to translate ALL elements of the basic ER Model to a relational schema to earn the basic marks. You do not have to translate the whole ER Model if you did additional work to gain more marks for the ER model in Task 1.

Task 2	Description	Mark
BASIC REQUIREMENTS – 15 Marks		
2.1	Mapping of one supertype and two subtypes	3
2.2	Mapping two additional entities	2
2.3	a) One-to-Many relationship b) Any other binary relationship Showing the appropriate foreign keys and indicating which tables they are referencing	2.5 2.5
2.4	Mapping the multivalued attribute	2.5
2.5	Primary Keys for all relations	2.5
ADDITIONAL WORK – 5 Marks		
2.6	Check if the relations are in third normal form and decompose them further if they are not; convert more elements of EER model.	5
	TOTAL MARKS	20

SUBMISSION: schemas included in the report: COM1025_CW_URN.pdf

Please show schemas as indicated in the provided report template. You run the risk of losing marks if you do not adhere to the requested format.

Task 3: Implement the Relation Schema in MySQL and Populate it with Data

The third step is to create the tables using SQL and populate them with data. You don't have to implement all the relations – for the basic marks you need at least three tables linked with foreign keys and such that you can write the queries specified below. You should populate them with at least 5 but recommended 10 rows of data.

Task	Description of tasks	Mark
BASIC REQUIREMENTS – 15 Marks		
3.1	Table implementations with all regular attributes (3 tables)	1.5
3.2	Domains of all the attributes specified correctly	3
3.3	Primary keys specified correctly	1.5
3.4	Foreign keys specified properly	2
3.5	One SELECT statement using GROUP BY or/and an aggregate function or an operator	2
3.6	One statement with a subquery	2
3.7	One statement with a JOIN or linking two tables	3
ADDITIONAL WORK – 5 Marks		
3.8	Specifying any other constraints and/or more complicated queries	5
	TOTAL MARKS	20

SUBMISSION: All the SQL statements should be submitted in one file: COM1025_CW_URN.sql

Task 4: Use PHP to Interact with the Database and create some dynamic Web Content

Please note that for the website part only PHP code for manipulating the MySQL database will carry marks, so do not over-do the website part for this coursework – instead pay more attention to the data modelling and database design parts.

There should be at least one dynamic MySQL query where "dynamic" means the MySQL statement is not static but dynamically constructed based on one or more PHP variables (e.g. input from a URL query string or an HTML form, data retrieved from another MySQL query, data read from a PHP function such as date(), etc.

Task	Description of tasks	Mark
BASIC REQUIREMENTS – 15 Marks		
4.1	PHP code for connecting to the MySQL database	2
4.2	PHP code for properly releasing a connection to the MySQL database	1
4.3	PHP code for querying the MySQL database	2
4.4	PHP code for reading data out of the result of a MySQL query	4
4.5	PHP code for properly freeing results of a MySQL query	1
4.6	At least one dynamically constructed MySQL statement	2
4.7	PHP code for error handling around accessing the MySQL database	3
ADDITIONAL WORK – 5 Marks		
4.8	PHP scripts to implement more advanced database queries and/or handle the validation of the input data in PHP.	5
	TOTAL MARKS	20

SUBMISSION: The PHP files will be submitted in the zip folder COM1025_CW_URN_website.zip.

5 - Coursework Report

There will be 7 marks for the business rules and assumptions, otherwise the report will be marked according to completeness, clarity, readability and general writing quality.

DESCRIPTION OF CATEGORIES	MARK
1. Developing and testing environment	2
2. EER Diagram	2
3. Business rules/assumptions	7
4. Conceptual/Logical relational database schema	2
5. Website/PHP code working with MySQL database	2
TOTAL	15

SUBMISSION submitted in pdf format with the following title COM1025_CW_URN.pdf

Please refer to the provided report template "COM1025_2020_Report_Template.doc" for the format and structure of the written report. The submitted report must be a single PDF file.

The template structure is as follows:

Page 1 (one page maximum):

1. Development Environment
2. EER Data Model Business Rules and Assumptions

Page 2 (one page maximum)

3. EER Diagram

Page 3 (one page maximum)

4. Logical Database Schema

Page 4 (one page maximum)

5. Website working with the Database (screenshots)

Page 5 (one page maximum)

6. Advanced Tasks
7. References

Please make sure that you limit yourself to the specified length of the report (**5 pages**).

Any extra pages will not be marked.