ROBERT GORDON UNIVERSITY ABERDEEN

Assessment Brief - Coursework

Academic Year	2024-25
Semester	1 (One Semester)
Module Number	CM1603
Module Title	Database Systems
Assessment Method	Coursework (Individual)
Deadline (time and date)	3rd April 2025 at 11.30 pm (IST)
Submission	Assessment Dropbox in the Module Study Area in CampusMoodle. 1. Database Report 2. SQL Script
Word Limit	Not Applicable
Use of Generative Artificial Intelligence (AI) text	IS NOT authorised.
Module Co-ordinator	Dileeka Alwis

What knowledge and/or skills will I develop by undertaking the assessment?

Describe the knowledge and/or skills that students will develop by undertaking the assessment.

Develop an understanding of the principal theories, concepts and methods used in creating a Relational Database Management System (RDBMS). Specifically, you will be able to:

- analyse a given case study and identify the requirements to create a RDBMS.
- apply conceptual database design techniques to create an Enhanced Entity Relationship Diagram (EERD) with suitable entities, relationships, attributes, and multiplicities.
- apply database modelling techniques to convert the Conceptual Data Model (EERD) into the Logical Data Model (Relational Schema) with suitable integrity constraints.
- use MySQL with phpMyAdmin dashboard to implement and test a relational database using Structured Query Language (SQL).
- write SQL queries to create and manipulate data in the relational database according to the requirements and constraints of the given case study.

What knowledge and/or skills will I develop by undertaking the assessment?

On successful completion of the assessment students will be able to achieve the following Learning Outcomes:

1. Describe and evaluate underlying theory and principles of relational database management system (RDBMS).
2. Analyse and apply database design and modelling methods for a given business case study.
3. Use SQL as a data definition and data manipulation language and to query a relational database.
4. Implement and test relational database using a query language with a suitable interface.

Please also refer to the Module Descriptor, available from the module Moodle study area.

What is expected of me in this assessment?

Task(s) – Content

Case Study: Cafe' Management System

Sip 'n Snack is a well-established café in the city known for offering high-quality beverages and delicacies. As part of its growth strategy, the café is expanding to support online orders and doorstep delivery services to enhance customer convenience and streamline its operational efficiency.

The café offers a wide range of items, including beverages, snacks, cakes, desserts, and other speciality products. Each item is categorized into specific types and assigned a unique identification code, along with its name, price, and description. This categorization helps to manage inventory and streamline the ordering process.

Sip 'n Snack employs a team of diverse staff, including stewards, delivery staff, and managers. Each employee is assigned a unique staff ID, designation, and is associated with a supervisor to whom they report. The system will store essential personal details for each employee, with additional details such as driver's license information being recorded for delivery staff.

Customers can place orders containing one or more items. Each order will include the customer's contact number, email address, delivery address, order date and time, and preferred delivery date and time. Payment for the orders can be made through online payment methods or cash on delivery. The system will record comprehensive payment details, including the payment method and status of the transaction.

What is expected of me in this assessment?

Each order is assigned to a steward, who will be responsible for overseeing the entire process, from order preparation to successful delivery, ensuring that payment is settled. The steward is tasked with ensuring that orders are prepared on time, correctly assigned to the relevant delivery staff, and reached the customer's destination without any issues.

To support efficient delivery operations, the café maintains a fleet of delivery vehicles, which include bikes, minivans, and other types of transport. Each vehicle is assigned a unique vehicle ID, vehicle type, and is linked to a specific delivery staff. This ensures that deliveries are carried out on time and with the appropriate transportation for the order size and distance.

Additionally, the system enables real-time tracking of order progress, updating customers on the status of their order at various stages Order Placed, Preparing, Out for Delivery and Delivered.
This system design provides a robust structure for managing customer orders, staff coordination, and delivery operations effectively, and forms the basis for the database that will power Sip 'n Snack's online and delivery services.

You have been appointed as a Database Management Architect by Sip 'n Snack to develop the database for the Cafe' Management System. Your primary objective is to design a high-quality **Conceptual Data Model,** and a **Logical Data Model** tailored for the specified Relational Database Management System (RDBMS). Additionally, you are tasked with developing the **Physical Data Model** by creating appropriate SQL queries using MySQL.

An executive report should be provided to justify your database design along with the underlying assumptions made during the process. The report should also include the relevant SQL queries utilized in the development of the database, accompanied by high-quality screenshots as evidence of your work.

Task(s) - Format

Your submission should include the following:

1) Database Report
2) SQL Script

What is expected of me in this assessment?

Database Report

This should be a PDF that includes:

- a cover sheet that contains RGU and IIT Student ID, student name, module code and module title.
- table of contents, list of figures, list of tables etc.
- section 1: Extended Entity Relationship Diagram (EERD)
- section 2: Relational Schema Diagram
- section 3: Data Normalization (up to 3NF)
- section 4: Table Creation and Population of data
- section 5: Data Manipulation with SQL
- reference list

Section 1: Conceptual Extended Entity Relationship Diagram (EERD)

Provide an accurate Extended ERD with suitable entities, relationships, attributes, and multiplicity constraints with suitable assumptions. You need to identify additional attributes for each entity.

Note that your diagram must include the given requirements, but you are allowed to add new requirements as they do not alter the case study's scope.

The diagram needs to fit into a single page of the report while maintaining the clarity. Mention all the relevant assumptions you have made.

This section will be evaluated based on the following criteria:

- Listing of suitable assumptions
- Identification of suitable entities
- Identification of suitable key and non-key attributes
- Identification of meaningful relationships between entities
- Identification of suitable multiplicity constraints
- Design of a complete EERD

Section 2: Logical ERD (Relational Schema)

Provide an accurate Relational Schema Diagram for the above EERD with all the relations, primary keys, foreign keys, and other attributes. This needs to fit into one page of the report. Mention all the appropriate assumptions you have made.

This section will be evaluated based on the following:

- Identification of the appropriate relations
- Identification of the correct primary keys, foreign keys, and non-key attributes
- Design a complete Relational Schema Diagram

What is expected of me in this assessment?

Section 3: Data Normalization (up to 3NF)

Provide a comprehensive explanation and justification of the data normalization process for all relations identified from the provided relational schema. For each relation, clearly identify the functional dependencies at each stage of normalization and demonstrate the steps taken to achieve Third Normal Form (3NF). Ensure that you justify your normalization decisions, and all functional dependencies are resolved to minimize redundancy and prevent anomalies. Additionally, mention any relevant assumptions made during the process.

This section will be evaluated based on the following criteria:

- Identification and resolution of functional dependencies.
- Justification of normalization decisions with normalization principles.
- Identification of the correct primary keys, foreign keys and non-key attributes.

Section 4: Table Creation and Population of Data

Provide the SQL queries used to implement the above relational schema in MySQL. Each table should consist of appropriate table names, field names, data types, field sizes, and constraints (if applicable). It is required to submit clear screenshots as evidence of all the SQL queries used for table creation, as well as the specification of each column within the tables after their creation in the database.

Provide the Database Diagram generated by the system by indicating all the tables, their attributes, and relationships clearly.

Furthermore, insert at least 5 meaningful sample data into each table. Note that the sample data in each table must satisfy the requirements given in Section 4. For each table created, provide clear screenshot evidence displaying the entered sample data.

This section will be evaluated based on the following:

- Use of appropriate table names and field names
- Use of appropriate data types and field sizes
- Use of appropriate constraints
- Writing accurate DDL Queries for table creation
- Presentation of a clear Database Diagram
- Insertion of meaningful sample data for each table

Section 5: Data Manipulation with SQL

Generate suitable SQL queries to perform the below tasks. The screenshot evidence of each SQL query and the respective output should be included in the report clearly. Make sure to include suitable field names to display a meaningful output to the user.

What is expected of me in this assessment?

a) Retrieve the top 10 most frequently ordered items in March 2025, displaying their item name, category, and the total number of orders placed during this period.

b) Retrieve the total revenue generated by each steward, along with their staff ID and full name, for stewards with the first name 'John', 'Peter', and 'Nicola', who have successfully completed more than 5 deliveries within the past 2 weeks.

c) Retrieve the order ID, order status, and expected delivery date and time for all cash on delivery orders that are scheduled to be delivered within the next 10 hours and are assigned to vehicles other than minivans.

This section will be evaluated based on the following criteria:

- Creation of error free DML queries
- Production of accurate result sets with meaningful sample data

SQL Script

It should be simple text document (eg: .txt) which includes all the SQL queries used to:

- table creation (section 4)
- population of data (section 4)
- data manipulation (section 5)

Note that you need to copy and paste all the original SQL queries used to create the database and manipulate data.

Also note that the marks will be deducted if the DB backup file is not submitted.

How will I be graded?

A number of subgrades will be provided for each criterion on the feedback grid which is specific to the assessment.
The overall grade for the assessment will be calculated using the algorithm below.

A	At least 50% of the subgrades to be at Grade A, at least 80% of the subgrades to be at Grade B or better, and normally 100% of the subgrades to be at Grade C or better.
B	At least 50% of the subgrades to be at Grade B or better, at least 80% of the subgrades to be at Grade C or better, and normally 100% of the subgrades to be at Grade D or better.
C	At least 50% of the subgrades to be at Grade C or better, and at least 80% of the subgrades to be at Grade D or better.
D	At least 50% of the subgrades to be at Grade D or better, and at least 80% of the subgrades to be at Grade E or better.

How will I be graded?	
E	At least 50% of the subgrades to be at Grade E or better.
F	Failing to achieve at least 50% of the subgrades to be at Grade E or better.
NS	Non-submission.

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Feedback grid

GRADE	A	B	C	D	E	F
DEFINITION / CRITERIA (WEIGHTING)	**EXCELLENT** Outstanding Performance	**COMMENDABLE/VERY GOOD** Meritorious Performance	**GOOD** Highly Competent Performance	**SATISFACTORY** Competent Performance	**BORDERLINE FAIL**	**UNSATISFACTORY** Fail
Conceptual Entity Relationship Diagram (EERD) **(Weight 2)**	An excellent EERD has been produced. All relevant entities are correctly identified. Most relevant key and non-key attributes are correctly identified for each entity. All relevant relationships and multiplicities are correctly identified. Clarity, formatting, and structure of the complete EERD is excellent. Most appropriate assumptions are identified.	A very good EERD has been produced. Relevant entities are correctly identified. Relevant key and non-key attributes are correctly identified for each entity. Relevant relationships and multiplicities are correctly identified. Clarity, formatting, and structure of the complete EERD is very good. Appropriate assumptions are identified.	A good EERD has been produced. Number of relevant entities are correctly identified. Number of relevant key and non-key attributes are correctly identified for each entity. Number of relevant relationships and multiplicities are correctly identified. Clarity, formatting, and structure of the complete EERD is good. Number of appropriate assumptions are identified.	A reasonable EERD has been produced. 3 or 4 relevant entities are identified. 2 or 3 reasonable key and non-key attributes are identified for each entity. 2 or 3 reasonable relationships and multiplicities are identified. Clarity, formatting, and structure of the complete EERD is reasonable. 2 or 3 reasonable assumptions are identified.	An approximately reasonable ERD has been produced. 2 or 3 relevant entities are identified. 1 or 3 approximately reasonable key and non-key attributes are identified for each entity. 1 or 2 approximately reasonable relationships and multiplicities are identified. Clarity, formatting, and structure of the complete ERD need to be improved. 1 or 2 approximately reasonable assumptions are identified.	No ERD has been produced or a semantically poor ERD with inappropriate and/or incorrect entities and/or relationships and/or key and non-key attributes and/or multiplicities. Clarity, formatting, and structure of the complete ERD is semantically poor. Appropriate assumptions need to be identified.
Logical ERD (Relational Schema Diagram) **(Weight 1)**	An excellent Relational Schema Diagram has been produced. All relevant relations are correctly identified. Most relevant non-key attributes, primary key and foreign keys (if applicable) are correctly identified for each	A very good Relational Schema Diagram has been produced. Relevant relations are correctly identified. Relevant non-key attributes, primary key and foreign keys (if applicable) are correctly identified for each relation. Relevant relationships and multiplicities are correctly	A good Relational Schema Diagram has been produced. Number of relevant relations are correctly identified. Number of relevant non-key attributes, primary key and foreign keys (if applicable) are correctly identified for each	A reasonable Relational Schema Diagram has been produced. 3 or 4 relevant relations are identified. 2 or 3 reasonable non-key attributes, primary key and foreign keys (if applicable) are correctly identified for each	An approximately reasonable Logical Relational Schema Diagram has been produced. 2 or 3 relevant relations are identified. 1 or 3 approximately reasonable non-key attributes, primary key and foreign keys (if	No Relational Schema Diagram has been produced or a semantically poor diagram with inappropriate and/or incorrect relations and/or relationships and/or non-key attributes and/or primary key and/or

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	relation. All the relationships and multiplicities are correctly mapped. Clarity, formatting, and structure of the work is excellent.	mapped. Clarity, formatting, and structure of the work is very good.	relation. Number of relevant relationships and multiplicities are correctly mapped. Clarity, formatting, and structure of the work is good.	relation. 2 or 3 reasonable relationships and multiplicities are mapped. Clarity, formatting, and structure of the work is reasonable.	applicable) are identified for each relation. 1 or 2 approximately reasonable relationships and multiplicities are mapped. Clarity, formatting, and structure of the work need to be improved.	multiplicities and/or foreign keys (if applicable). Clarity, formatting, and structure of the complete work is semantically poor.
Data Normalization **(Weight 1)**	An excellent justification of data normalization has been provided. The design demonstrates a thorough understanding of normalization principles, with all relations normalized up to 3NF. Functional dependencies have been appropriately addressed, ensuring minimal redundancy and prevention of anomalies.	A very good justification of data normalization has been provided. The design demonstrates a solid understanding of normalization principles, with most relations normalized up to 3NF. While functional dependencies have been addressed, there are minor instances of redundancy or potential anomalies that could be improved.	A good justification of data normalization has been provided. The design shows an adequate understanding of normalization, but only some relations are normalized up to 3NF. Functional dependencies are mostly correct, but there are several areas where redundancy or anomalies may occur. More attention to detail and further refinement would enhance the normalization process.	A basic attempt at justifying data normalization has been made. The design demonstrates a limited understanding of normalization principles, with only a few relations normalized up to 3NF. Functional dependencies are not consistently addressed, leading to redundancy and potential anomalies. Significant improvements are needed in understanding and applying normalization principles.	An insufficient justification of data normalization has been provided. The design shows minimal understanding of normalization principles, with most relations not normalized beyond 1NF or 2NF. Functional dependencies are largely incorrect or missing, resulting in considerable redundancy and the likelihood of anomalies. A stronger focus on normalization concepts is required.	Very little or no justification of data normalization has been provided. The design lacks a clear understanding of normalization principles, with relations not reaching 3NF and functional dependencies not addressed. Redundancy and anomalies are prevalent throughout. Substantial work is required to meet the basic standards of normalization and database design.
Table Creation and Population of data **(Weight 1)**	An excellent script of SQL codes with relevant comments has been produced to create and populate all the tables. All relevant data types, field sizes and constraints are correctly applied. Mostly	A very good script of SQL codes with relevant comments has been produced to create and populate all the tables. Relevant data types, field sizes and constraints are correctly applied. Relevant and	A good script of SQL codes with comments has been produced to create and populate the tables. Number of relevant data types, field sizes and constraints are correctly applied. Relevant and	A reasonable script of SQL codes has been produced to create and populate the tables. 2 or 4 relevant data types, field sizes and constraints are applied. Reasonable sample data has been entered to 2 or	An approximately reasonable script of SQL codes has been produced to create and populate the tables. 2 or 3 relevant data types and field sizes are applied. Reasonable sample data has been	A semantically poor and/or inappropriate and/or incorrect and/or no script of SQL codes has been produced to create and populate the tables. Applied data types and field sizes are irrelevant.

GRADE	A	B	C	D	E	F
DEFINITION / CRITERIA (WEIGHTING)	**EXCELLENT** Outstanding Performance	**COMMENDABLE/VERY GOOD** Meritorious Performance	**GOOD** Highly Competent Performance	**SATISFACTORY** Competent Performance	**BORDERLINE FAIL**	**UNSATISFACTORY** Fail
	relevant and meaningful sample data has been entered to each table which satisfy the table constraints. All the screenshot evidence and the DB diagram are included in the report. Clarity, formatting, and structure of the work is excellent. *** Cannot award if the SQL Script file is not submitted	meaningful sample data has been entered to each table which satisfy the table constraints. Relevant screenshot evidence and the DB diagram are included in the report. Clarity, formatting, and structure of the work is very good. *** Cannot award if the SQL Script file is not submitted.	meaningful sample data has been entered to number of tables which satisfy the table constraints. Number of relevant screenshot evidence and the DB diagram are included in the report. Clarity, formatting, and structure of the work is good. *** Cannot award if the SQL Script file is not submitted.	4 tables which satisfy the table constraints. Reasonable number of screenshot evidence and the DB diagram are included in the report. Clarity, formatting, and structure of the work is reasonable.	entered to 1 or 2 tables which satisfy the table constraints. Approximately reasonable screenshot evidence is included in the report. No DB diagram is included in the report. Clarity, formatting, and structure of the work needs to be improved.	Sample data has entered to tables are irrelevant and/or meaningless and/or not satisfy the table constraints. No screenshot evidence and no DB diagram included in the report. Clarity, formatting, and structure of the work is semantically poor.
Data Manipulation with SQL **(Weight 1)**	An excellent script of SQL codes with relevant conditions and comments to has been produced to generate the correct result-set. All the screenshot evidence is included in the report. Clarity, formatting, and structure of the query result-set is excellent. *** Cannot award if the SQL Script file is not submitted	A very good script of SQL codes with relevant conditions has been produced to generate the correct result-set. All the screenshot evidence is included in the report. Clarity, formatting, and structure of the query result-set is very good. *** Cannot award if the SQL Script file is not submitted	A good script of SQL codes with conditions has been produced to generate the result-set. Relevant screenshot evidence is included in the report. Clarity, formatting, and structure of the query result-set is good. *** Cannot award if the SQL Script file is not submitted	A reasonable script of SQL codes has been produced to generate the result-set. Reasonable screenshot evidence is included in the report. Clarity, formatting, and structure of the query result-set is reasonable.	An approximately reasonable script of SQL codes has been produced but fails to generate the result-set. Approximately reasonable screenshot evidence is included in the report. Clarity, formatting, and structure of the query result-set needs to be improved.	A semantically poor and/or inappropriate and/or incorrect and/or no script of SQL codes has been produced to generate the correct result-set. No screenshot evidence is included in the report. Clarity, formatting, and structure of the query result-set is semantically poor.

GRADE	A	B	C	D	E	F
DEFINITION / CRITERIA (WEIGHTING)	**EXCELLENT** Outstanding Performance	**COMMENDABLE/VERY GOOD** Meritorious Performance	**GOOD** Highly Competent Performance	**SATISFACTORY** Competent Performance	**BORDERLINE FAIL**	**UNSATISFACTORY** Fail
Knowledge, Awareness, and Preparation for the demonstration **(Weight 2)**	An excellent knowledge and awareness of the theories and concepts applied. Excellent justification for the use of appropriate methods and techniques. On-time participation. Excellent preparation for the demonstration.	A very good knowledge and awareness of the theories and concepts applied. Very good justification for the use of appropriate methods and techniques. On-time participation. Very good preparation for the demonstration.	A good knowledge and awareness of the theories and concepts. Good justification for the use of certain methods and techniques. On-time participation. Good preparation for the demonstration.	A reasonable knowledge and awareness of the theories and concepts. Reasonable justification for the use of certain methods and techniques. Late participation for the demonstration / less preparation for the demonstration / failed to handle the issues during the demonstrations.	An approximately reasonable knowledge and awareness of the theories and concepts. Poor justification for the use of certain methods and techniques. Late participation for the demonstration / poor preparation for the demonstration / failed to handle the issues during the demonstrations.	A semantically poor knowledge and awareness of the theories and concepts. Very poor justification for the use of certain methods and techniques. Late participation for the demonstration / very poor preparation for the demonstration / failed to handle the issues during the demonstrations / failed to execute any SQL query.
Ability to create an error free DML query for a given requirement **(Weight 2)**	Complete implementation of an accurate SQL query with relevant logics and conditions. Accurate result-set has been produced. Excellent justification for the use of appropriate logics and conditions.	Partial implementation of an accurate SQL query with few relevant logics and conditions. Partially accurate result-set has been produced. Very good justification for the appropriate logics and conditions.	Partial implementation of a SQL query with few logics and conditions. Generates an incorrect / irrelevant result-set. Good justification for appropriate logics and conditions.	Reasonable attempt to implement a SQL query. Query execution generates errors. Failed to generate a result-set. Reasonable justification for appropriate logics and conditions.	Poor attempt to implement a SQL query. Query execution generates errors. Failed to generate a result-set. Poor justification for appropriate logics and conditions.	No attempt to implement a SQL query. Very poor justification for appropriate logics and conditions.

Coursework received late, will be regarded as a non-submission (NS) and one of your assessment opportunities will be lost.

What else is important to my assessment?

What is the Assessment Word Limit Statement?

It is important that you adhere to the Word Limit specified above. The Assessment Word Limit Statement can be found in Appendix 2 of the RGU Assessment Policy. It provides detail on the purpose, setting and implementation of wordage limits; lists what is included and excluded from the word count; and the penalty for exceeding the word count.

What's included in the word count?

The table below lists the constituent parts which are included and excluded from the word limit of a Coursework; more detail can be found in the full Assessment Word Limit Statement. Images will not be allowed as a mechanism to circumvent the word count.

Excluded	Included
Cover or Title Page	Main Text e.g. Introduction, Literature Review, Methodology, Results, Discussion, Analysis, Conclusions, and Recommendations
Executive Summary (Reports) or Abstract	Headings and subheadings
Contents Page	In-text citations
List of Abbreviations and/or List of Acronyms	Footnotes (relating to in-text footnote numbers)
List of Tables and/or List of Figures	Quotes and quotations written within "…"
Tables – mainly numeric content	Tables – mainly text content
Figures	
Reference List and/or Bibliography	
Appendices	
Glossary	

What are the penalties?

The grade for the submission will be reduced to the next lowest grade if:

- The word count of submitted work is above the specified word limit by more than 10%.
- The submission contains an excessive use of text within Tables or Footnotes.

What else is important to my assessment?

What is plagiarism?

Plagiarism is "the practice of presenting the thoughts, writings or other output of another or others as original, without acknowledgement of their source(s) at the point of their use in the student's work. All materials including text, data, diagrams or other illustrations used to support a piece of work, whether from a printed publication or from electronic media, should be appropriately identified and referenced and should not normally be copied directly unless as an acknowledged quotation. Text, opinions or ideas translated into the words of the individual student should in all cases acknowledge the original source" (RGU 2022).

What is collusion?

"Collusion is defined as two or more people working together with the intention of deceiving another. Within the academic environment this can occur when students work with others on an assignment, or part of an assignment, that is intended to be completed separately" (RGU 2022).

For further information please see Academic Integrity.

What if I'm unable to submit?

- The University operates a Fit to Sit Policy which means that if you undertake an assessment then you are declaring yourself well enough to do so.
- If you require an extension, you should complete and submit a Coursework Extension Form. This form is available on the RGU Student and Applicant Forms page.
- Further support is available from your Course Leader.

What additional support is available?

- RGU Study Skills provide advice and guidance on academic writing, study skills, maths and statistics and basic IT.
- RGU Library guidance on referencing and citing.
- The Inclusion Centre: Disability & Dyslexia.
- Your Module Coordinator, Course Leader and designated Personal Tutor can also provide support.

What are the University rules on assessment?

The University Regulation 'A4: Assessment and Recommendations of Assessment Boards' sets out important information about assessment and how it is conducted across the University.