

INTRODUCTION TO DATABASES

YEAR 1 – CW2_ Practical Skills Assessment (60%)

Assignment hand-out: **9:00 am Monday 20th October 2025**

Hand-in: **Thursday 27th November 2025 at 12 Noon.**

Feedback: You will receive feedback within 20 working days of the submission deadline.

Staff Responsible for Assignment: QAHE Team

Overview

This assignment consists of a **Supplementary Design Document** and **video screencast** assessing your practical skills in the design and implementation of database systems. The mark achieved in this assignment will contribute to 60% of the overall module mark.

Learning Outcomes Covered by the Assignment

Successful students will be able to:

- Apply techniques to design and implement SQL to meet a real-world scenario.
- Communicate and present information to justify database design decisions and demonstrate SQL query execution.

Description & Deliverables

Working individually, you are required to design a database capable of meeting a business' needs, implement your design using either SQL Server OR MySQL, and provide a walkthrough demonstration of your solution and underpinning code base via a recorded video screencast.

You will submit 2 artefacts for this assignment:

1. **A Supplementary Design Document (3 pages)** containing:

- Database Design: ER Diagram (page 1)
- Database schema (page 2)
- Limitations and assumptions relating to the design process (page 3)

2. **Video screencast (10 minutes duration)** will be submitted by each student using Blackboard.

Video screencast will be narrated by the student discussing the following components:

- Database Implementation (Walkthrough and execution of code written to create and populate the database)
- SQL queries for the Business Scenario
- Walkthrough and execution of queries.

Business Scenario and Business Processes

A library management system requires a database to manage its books, members, and borrowing activities.

There are a number of library members, each of whom may borrow one or more books, with each borrowing transaction associated with an individual member. A book may be borrowed many times, but each borrowing transaction involves only one book. Books are categorized by genre, and each book may belong to one or more genre. The library also tracks the authors of the books, where each book may have one or more authors, and each author may have written multiple books.

Information to be held and manipulated includes:

- *the name, address, email, phone number, and membership ID of each library member.*
- *the title, ISBN, genre, publication year, and number of copies available for each book.*
- *the id, name, nationality, and biography of each author.*
- *the borrowing ID, borrowing date, and due date for each borrowing transaction.*
- *the genre ID and genre name for each book category.*

An unstructured Excel file of the data to be entered into the database should be downloaded from **Blackboard**.

Business Processes to be supported include the ability to:

1. *add details of a new library member together with the borrowing date and due date of a book they have borrowed, but without specifying the book to be borrowed.*
2. *list the total number of books borrowed by each member between two given dates.*
3. *get a list of books (by title) borrowed by a specific member, together with the borrowing date and due date, ordered by borrowing date.*
4. *list all books in a specific genre, together with the number of copies available.*
5. *remove a book temporarily from circulation (e.g., for repair) and get a list of books that are currently unavailable.*

Tasks and Deliverables

Task One: Noting any simplifying assumptions you make, design a relational database schema capable of supporting the given business scenario and storing the data provided in the sample data file.

Task Two: Write SQL code to implement your database design. You should save your code and use constraints, default values, ON DELETE clauses, etc. as appropriate for the business scenario.

Task Three: Implement your database using either SQL Server OR MySQL OR Azure Data Studio and populate it with the data provided in the sample data file.

Task Four: You are required to produce a supplementary document (3 pages) and a video screencast (10 minutes) which provides the detail as follows:

- **A Supplementary Design Document (3 pages)** containing ER Diagram (page 1), Database schema (page 2), and Limitations and assumptions relating to the design process (page 3).
- **Video screencast (10 minutes duration)** will be narrated by the student discussing these components: Database Implementation (Walkthrough and execution of code written to create and populate the database), SQL queries for the Business Scenario, and Walkthrough and execution of queries.

A detailed guide, outlining what the **Supplementary Design Document** and **video screencast** needs to contain, can be found in the **Coursework** folder in Blackboard. Video Screencasts that go beyond **ten minutes** will be penalised according to the University framework of penalties (a summary of this is available on the next page). An unstructured Excel file of the data to be entered into the database can also be found on Blackboard.

Please read the remaining pages of this specification document for information on the submission process and the assessment criteria.

Submission Requirements

A submission area for both Supplementary Design Document and Video Screencast Submission is provided in the **Coursework** folder in Blackboard.

Video Screencast Submission (Time Limit 10 Minutes)

Detailed guidelines on the required content, structure and production of the video screencast are provided in the Coursework Assignment folder in Blackboard. Please ensure the filename of the Supplementary Design Document and video screencast submitted is given as Surname_BCode (e.g., ‘Burns_B00123456.mp4’).

Penalties for Exceeding Workload:

Where submitted work exceeds the agreed assessment limit, a margin of up to +10% of the work limit will be allowed without any penalty of mark deduction.

If the work submitted is significantly in excess of the specified limit (+10%), there is no expectation that staff will assess the piece beyond the limit or provide feedback on work beyond this point. Markers will indicate the point at which the limit is reached and where they have stopped marking. A mark will be awarded only for the content submitted up to this point. No additional deduction or penalty will be applied to the overall mark awarded. The student is self-penalising as work will not be considered-marked.

Notes on Submission:

- Students should ensure that the submitted video screencasts conform to mp4 format. **Corrupted files will be treated as a non-submission.**
- This is an individual assignment and all work submitted must be your own. Plagiarism will not be tolerated and will be dealt with according to university policy: <https://www.ulster.ac.uk/student/exams/cheating-and-plagiarism>
- Late submission, with the exemption of those supported by prior submission of an EC1 form, will not be marked and will be considered non-submissions.

Assessment Criteria

Marks will be awarded based upon an assessment of the evidence provided within the recorded video screencast according to the criteria in **pages 5-7**. While the assessment elements in the following table total to 100% of this coursework mark, it is important to note that the mark for this coursework contributes to 60% of the overall module mark.

Criteria (100%)	0-39% Fail Limited- Unacceptable	40-49% 3rd Adequate	50-59% 2.2 Acceptable	60-69% 2.1 Good quality work	70-100% 1st Excellent- Outstanding
Database Design 30%	<p>No ER diagram or very limited ER diagram which does not represent the business scenario.</p> <p>No cardinality ratios discussed or no justification of the presented cardinality ratios.</p> <p>No participation constraints discussed or no justification of the presented participation constraints.</p> <p>No Relational schema is presented or it is presented but no PKs or FKs are evidenced. Tables are not in 3NF. No justification for any additional tables/attributes.</p> <p>Overview of data types is incomplete. No justifications provided for chosen data types.</p> <p>No tables are in 3NF and descriptions provided for each are limited</p> <p>Assumptions for the modelling process are not provided or not at all relevant.</p> <p>Limitations for either the modelling process or the implemented solution are not discussed or not at all relevant.</p>	<p>ER diagram is presented but it might not be fully representative of the business scenario and does not correctly present all cardinality ratios or participation constraints.</p> <p>Cardinality ratios are discussed but the justification is barely adequate and in some cases incorrect.</p> <p>Participation constraints are discussed but the justification is barely adequate and in some cases incorrect.</p> <p>Relational schema is presented but it might not evidence FKs or they might not be in the optimal tables. Tables might not all be in 3NF. Any additional tables/attributes are not sufficiently justified.</p> <p>All data types and necessary justifications are discussed. Not all justifications are logical or optimised.</p> <p>Most tables are in 3NF and descriptions provided for each are adequate.</p> <p>Assumptions for the modelling process are basic and only somewhat relevant.</p> <p>Limitations for either the modelling process or the implemented solution are basic and only somewhat relevant.</p>	<p>ER diagram presented with acceptable representation of the business scenario. All cardinality ratios and participation constraints are clear from the diagram alone but some may not be correct.</p> <p>All cardinality ratios are discussed and their justification is acceptable.</p> <p>All participation constraints are discussed and their justification is acceptable.</p> <p>Relational schema is acceptable. PKs and FKs are indicated but more optimal attributes or tables could have been selected for some FKs. Tables in schema are in 3NF. Any additional tables/attributes have acceptable justifications.</p> <p>All data types and necessary justifications are discussed.</p> <p>Justifications acceptable but some choices of data types or data lengths could be improved.</p> <p>All tables are in 3NF and descriptions provided for each are acceptable.</p> <p>Assumptions for the modelling process are acceptable and sufficiently relevant.</p> <p>Limitations for either the modelling process or the implemented solution are good and sufficiently relevant.</p>	<p>ER diagram is presented and its representation of the business scenario is good. All cardinality ratios and participation constraints are clear from the diagram alone and they each correctly represent the business scenario</p> <p>All cardinality ratios are discussed and their justification is of good quality.</p> <p>All participation constraints are discussed and their justification is of good quality.</p> <p>Relational schema is presented and is of good quality. Good selection of PKs and FKs, including the tables the FKs are placed in. Tables in schema are in 3NF. Any additional tables/attributes have good quality justifications.</p> <p>All data types and necessary justifications are discussed.</p> <p>Justifications for data types and data lengths are good.</p> <p>All tables are in 3NF and descriptions provided for each are good.</p> <p>Assumptions for the modelling process are good and completely relevant.</p> <p>Limitations for both the modelling process and the implemented solution are good and completely relevant.</p>	<p>ER diagram is presented and its representation of the business scenario is excellent. All cardinality ratios and participation constraints are clear from the diagram alone and presentation of diagram and its components is excellent.</p> <p>All cardinality ratios are discussed and their justification is excellent.</p> <p>All participation constraints are discussed and their justification is excellent.</p> <p>Relational schema is excellent. Outstanding selection of PKs and FKs, including the tables the FKs are placed in. Tables in schema are in 3NF. Any additional tables/attributes have excellent justifications.</p> <p>All data types and necessary justifications are discussed.</p> <p>Justifications for data types and data lengths are outstanding.</p> <p>All tables are in 3NF and descriptions provided for each are excellent.</p> <p>Assumptions for the modelling process are excellent and completely relevant.</p> <p>Limitations for both the modelling process and the implemented solution are excellent</p>

			<i>acceptable and sufficiently relevant.</i>		<i>and completely relevant.</i>
Database Implementation 30%	<p><i>Limited correctness and completeness of SQL code with limited discussion on the creation and population of database tables.</i></p> <p><i>No constraints, default values, on delete clauses, stored procedures or triggers are used or demonstrated.</i></p> <p><i>No use of comments in SQL code.</i></p> <p><i>Limited SQL code layout and readability.</i></p> <p><i>Assessment of the solution's conformity to the business scenario is not provided</i></p>	<p><i>Adequate correctness and completeness of SQL code, including adequate discussion on either code to create and populate tables or the process to import data from a file.</i></p> <p><i>Only the use of constraints is presented in the video. Default values, on delete clauses, stored procedures and triggers are not used or demonstrated.</i></p> <p><i>Minimal use of comments in SQL code.</i></p> <p><i>Adequate SQL code layout and readability.</i></p>	<p><i>Acceptable correctness and completeness of SQL code, including acceptable discussion on either code to create and populate tables or the process to import data from a file. Acceptable presentation of any SQL code required to handle imported data.</i></p> <p><i>Acceptable use of constraints and default values is presented in the video. On delete clauses, stored procedures or triggers are not used or demonstrated.</i></p> <p><i>Acceptable use of comments in SQL code.</i></p> <p><i>Acceptable SQL code layout and readability.</i></p> <p><i>Assessment of the solution's conformity to the business scenario is provided. Requested points of discussion (completeness of approach, limitations) are acceptable.</i></p> <p><i>.</i></p>	<p><i>Good correctness and completeness of SQL code, including good discussion and presentation of either SQL code to create and populate tables or the process to import data from a file. Good presentation of SQL code required to handle imported data (if necessary for selected approach).</i></p> <p><i>Good use of constraints, default values and on delete clauses is presented in the video. Good use of either stored procedures or triggers is also demonstrated.</i></p> <p><i>Use of good quality comments in SQL code.</i></p> <p><i>SQL code layout and readability are of good quality</i></p> <p><i>Assessment of the solution's conformity to the business scenario is provided. Requested points of discussion (completeness of approach, limitations) are of good quality.</i></p>	<p><i>Excellent correctness and completeness of SQL code, including excellent discussion and presentation of either SQL code to create and populate tables or the process to import data from a file. Excellent presentation of SQL code required to handle imported data (if necessary for selected approach).</i></p> <p><i>Excellent use of constraints, default values, on delete clauses, stored procedures and triggers is presented in the video.</i></p> <p><i>Use of excellent comments in SQL code.</i></p> <p><i>SQL code layout and readability are outstanding.</i></p> <p><i>Assessment of the solution's conformity to the business scenario is provided. Requested points of discussion (completeness of approach, limitations) are of outstanding.</i></p>
Business Process Queries 30%	<p><i>Zero or only one business process provided in a working state i.e. returns the requested results.</i></p> <p><i>Demonstration of business processes is limited.</i></p>	<p><i>Two business processes provided in a working state i.e. returns the requested results.</i></p> <p><i>Demonstration of business processes is adequate.</i></p>	<p><i>Three business processes provided in a working state i.e. returns the requested results.</i></p> <p><i>Demonstration and discussion of business processes are acceptable.</i></p>	<p><i>Four business processes provided in a working state i.e. returns the requested results.</i></p> <p><i>All business processes have been attempted and code is provided even for business processes that have not been fully supported.</i></p> <p><i>Demonstration of business processes is good and every business process is</i></p>	<p><i>Excellent completion of all business processes i.e. returns the requested results.</i></p> <p><i>Demonstration and discussion of all business processes are excellent.</i></p>

				<i>addressed with good quality discussion.</i>	
Presentation of Work 10%	<p><i>Limited walkthrough of SQL code overview and execution with no discussion of the components from the guidelines for this section.</i></p> <p><i>Limited or no discussion of SQL queries to support the business processes.</i></p>	<p><i>Walkthrough of SQL code overview and execution is adequate but some components from the guidelines are not addressed for this section.</i></p> <p><i>Adequate correctness, completeness and evidence of understanding of SQL queries to support the given business processes. Some components from the guidelines are not addressed for this section.</i></p>	<p><i>Walkthrough of SQL code overview and execution is acceptable and all components from the guidelines are addressed but their discussion is not extensive.</i></p> <p><i>Acceptable correctness, completeness and evidence of understanding of SQL queries to support the given business processes. All components from the guidelines are addressed for this section but further discussion could be provided.</i></p>	<p><i>Walkthrough of SQL code overview and execution is good and all components from the guidelines are addressed for this section with good quality.</i></p> <p><i>Good correctness, completeness and evidence of understanding of SQL queries to support the given business processes. All components from the guidelines are addressed for this section with good quality.</i></p>	<p><i>Walkthrough of SQL code overview and execution is excellent and all components from the guidelines are addressed for this section outstandingly.</i></p> <p><i>Excellent correctness, completeness and evidence of understanding of SQL queries to support the given business processes. All components from the guidelines are addressed for this section outstandingly.</i></p>