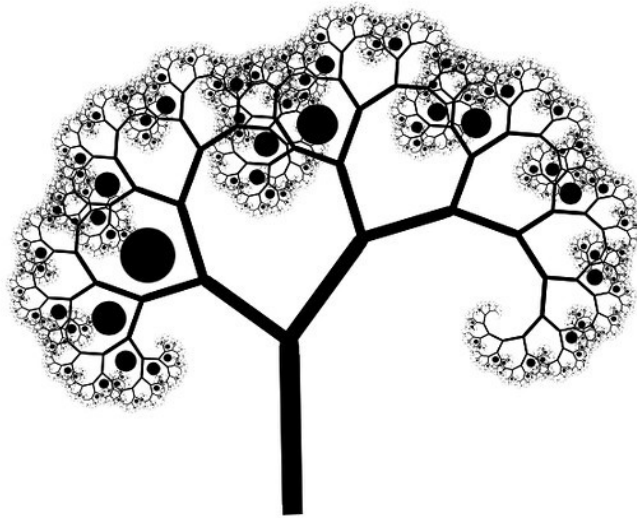


# Computer systems, data structures and data management

4CM508



4CM508 Assessment Brief – Coursework 2  
Dr Sam O'Neill

# Computer systems, data structures and data management (4CM508)

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## 1. Module Information

### Module Leader in Derby

- Dr Sam O'Neill
- [s.oneill@derby.ac.uk](mailto:s.oneill@derby.ac.uk)

### Module Leader in Athens

- Vasileios Markos
- [v.markos@mc-class.gr](mailto:v.markos@mc-class.gr)

### Module Leader in Thessaloniki

- Dr Kosmas Lazaridis
- [k.lazaridis@mc-class.gr](mailto:k.lazaridis@mc-class.gr)

## Key dates and details

Assessment Type:	Individual
Assessment weighting:	50%
Learning Outcomes:	2
Submission Method:	Electronic Submission via Course Resources
Submission Date:	15 <sup>th</sup> May 2026
Provisional Feedback Release Date:	05 <sup>th</sup> June 2026

### Description of the assessment

Design and analysis of a data engineering solution such as a database (table, structure, formats) for a given scenario.

### Learning Outcomes

1. Design and analyse data management solutions.

### Assessment Regulations

The [University's regulations, policies and procedures](#) for students define the framework within which teaching, and assessment are conducted. Please make sure you are familiar with these regulations, policies, and procedures.

## Distribution of Marks

- 1) Part A (40)
- 2) Part B (60)

**For a total of 100 marks.**

## Submission Requirements

- Students are required to submit a word/pdf document that contains answers to part A.
- Students should also submit their Microsoft Access implementation for Part B.
- These should all be submitted to the submission point on Course Resources before the deadline.

## Help Materials

You will find hundreds of tutorials and playlists on YouTube. Part of this assignment is doing the research where required to implement your Database with your desired functionality.

Microsoft have an entire help site dedicated to this - [Access help & learning \(microsoft.com\)](https://support.office.com/)

You can also open the one of the templates - [Featured Access templates - Microsoft Support](https://support.office.com/) and start to reverse engineer how these work.

## Assessment AI-assistance

In this assessment AI-assistance is permitted in the following ways:

- You MAY NOT use generative AI tools to help develop ideas and/or create a structure for inclusion in your written assessment.
- You MAY use AI tools to help identify appropriate academic sources to use within your written assessment.
- You MAY use AI tools to fix spelling, grammar and syntax issues in a presentation draft that you have written.
- You MAY use AI tools to receive feedback on your work so that you can enhance and improve your written assessment.
- You MAY NOT include invented references, such as those created by generative AI tools.
- You MAY NOT use AI Tools to produce the final version of your work or make inferences in your work.
- You MAY NOT use AI Tools to generate visualisations of your data (e.g., graphs).

It is YOUR RESPONSIBILITY to check ALL information generated by generative AI tools. Any misuse of generative AI tools could be considered ethical academic misconduct (as per [Academic Regulations, Academic Misconduct, Section J2](#)). If in doubt, please consult your module leader.

## 2. Assignment

*Please make sure you have read the marking rubrics for Part A and Part B. You will be marked using these.*

VeloCity Fitness is a growing chain of fitness centres with ten locations across the city. They offer a wide range of services, including gym memberships, personal training sessions, group classes, and specialised workshops (e.g., yoga retreats, nutrition seminars). Each location has its own set of instructors, class schedules, and pricing structures. VeloCity Fitness has been using various independent software solutions to manage their operations, including membership registrations, class schedules, personal training appointments, and payment processing. However, these systems are not integrated, leading to inefficiencies, data inconsistencies, and customer dissatisfaction.

To streamline their operations and improve customer experience, VeloCity Fitness has decided to develop a unified data management system. This system must not only manage their day-to-day operations but also accommodate their future expansion plans, including the potential opening of new locations and the introduction of online classes.

You have been hired as a data consultant to design and implement this system.

### Part A: Database Design

#### Task:

Design a relational database that will integrate VeloCity Fitness's operations. Your design should capture key data such as membership information, class and workshop schedules, personal training appointments, payments, and instructor management. You are given freedom to represent what you think is reasonable, but it should be justified.

#### Requirements:

**Entity Relationship Diagram (ERD):** Create an ERD that reflects your design, including attributes and relationships (with cardinality).

**Design Rationale:** Prepare a summary (1-3 pages) in 11 pt, explaining your key design decisions, and how the design supports efficient data management. You should be concise, anything beyond 3 pages will not be read.

**Deliverable:** ERD and a summary.

**[40 Marks]**

## Part B: Database Implementation

### Task:

Implement your proposed design in Microsoft Access with appropriate dummy data.

### Requirements:

**Tables:** Create the database with correct tables, attributes, and relationships based on your design.

**Forms:** Develop forms for adding new members, registering for classes/workshops, booking personal training sessions, and recording payments.

**Reports:** Create reports that summarise key metrics such as active memberships, monthly revenue, class popularity, and instructor performance.

**Interface:** Ensure the application is user-friendly, with additional functionality like alerts for renewals or capacity limits.

**Deliverable:** *Microsoft Access implementation.*

### Helpful Links:

- Forms - [Forms - Microsoft Support](#)
- Reports - [Reports - Microsoft Support](#)
- Interface and Overall Application - [Automate with macros - Microsoft Support](#)

**[60 Marks]**

### 3. Marking Rubric

#### Part A: Database Design

##### Entity-Relationship Diagram (ERD) (20 Marks)

Grade Band	Criteria
80%+	<b>Comprehensive ERD</b> with all entities, attributes, correct cardinality, and well-defined relationships.
70 – 79%	<b>Mostly correct ERD</b> , but with minor errors in cardinality or missing attributes.
60 – 69%	<b>Basic ERD structure</b> but missing key relationships or attributes.
50 – 59%	<b>Incomplete ERD</b> or incorrect relationships; missing important details.
40 – 49%	<b>Major ERD errors</b> , missing key relationships or attributes.
35 – 39%	<b>Basic ERD attempt</b> but missing most key elements and relationships.
1 – 34%	<b>ERD missing</b> or completely incorrect.

##### Design Rationale & Justification (20 Marks)

Grade Band	Criteria
80%+	<b>Well-structured, clearly written, and logically presented justification.</b> Explains <b>why</b> key design decisions were made, covering <b>table structures, relationships, constraints, and normalisation choices</b> . Discusses <b>efficiency, scalability, and data integrity</b> with <b>specific, relevant examples</b> . Uses appropriate terminology and is easy to follow.
70 – 79%	<b>Strong and well-written justification</b> , covering most design choices but missing some depth in areas like <b>efficiency considerations or scalability</b> . Some explanations could be more precise or detailed.
60 – 69%	<b>Adequately written explanation of table design and relationships</b> but lacks clear reasoning behind decisions. Some sections may be vague or missing key <b>rationale for efficiency and integrity</b> .
50 – 59%	<b>Minimal justification</b> , mostly <b>descriptive rather than analytical</b> . Focuses on <b>what was done rather than why</b> . Writing may be unclear or lack logical flow.
40 – 49%	<b>Weak explanation</b> , with <b>significant gaps</b> in reasoning. Missing key areas such as <b>data integrity, normalisation choices, or efficiency considerations</b> . Writing may be disorganised or difficult to follow.
35 – 39%	<b>Vague or poorly written justification</b> , with <b>little meaningful discussion</b> of design choices. Lacks proper structure and clarity.
1 – 34%	<b>No justification provided</b> , or reasoning is <b>irrelevant, incoherent, or completely missing</b> .

## Part B: Database Implementation

### Database Structure & Relationships (20 Marks)

Grade Band	Criteria
80%+	The <b>database schema</b> is fully <b>normalised (at least 3NF)</b> with <b>well-defined primary and foreign keys</b> . All <b>tables accurately reflect the ERD</b> , including correctly implemented relationships (one-to-many, many-to-many). Constraints such as <b>referential integrity and appropriate data types</b> are correctly applied.
70 – 79%	The database schema is well-structured, mostly normalised (some minor redundancy), and <b>all key relationships are correctly implemented</b> . Minor issues in <b>data types or constraints</b> but nothing critical.
60 – 69%	The database contains mostly correct <b>tables and relationships</b> , but some <b>normalisation issues exist</b> (e.g., repeated fields or unnecessary redundancy). <b>Most constraints are applied</b> , but there may be missing referential integrity in some cases.
50 – 59%	Some key relationships are missing or <b>incorrectly implemented</b> (e.g., incorrect use of foreign keys). Normalisation is <b>incomplete</b> (e.g., data duplication). Constraints are present but inconsistently applied.
40 – 49%	The database schema is <b>incomplete or has major flaws</b> (e.g., missing tables, incorrect primary keys, lack of normalisation). Relationships may not be properly established.
35 – 39%	A clear attempt has been made, but <b>significant structural errors</b> (e.g., missing relationships, incorrect primary/foreign keys) make the database difficult to use.
1 – 34%	The database <b>does not follow relational design principles</b> or lacks meaningful implementation.

## Forms & User Interface (20 Marks)

Grade Band	Criteria
<b>80%+</b>	Fully functional, <b>user-friendly forms</b> with well-designed <b>data entry fields, drop-downs, and validation</b> (e.g., preventing duplicate memberships). <b>Navigation is intuitive</b> , ensuring smooth data input.
<b>70 – 79%</b>	Forms are well-structured and functional, allowing <b>correct data entry</b> . Basic validation is included, but some usability issues exist (e.g., missing dropdowns for foreign key selections).
<b>60 – 69%</b>	Forms are functional but <b>lack advanced usability features</b> . Some forms may feel unintuitive or require <b>manual data input instead of lookup fields</b> .
<b>50 – 59%</b>	Forms exist but are <b>incomplete or lack key functionality</b> (e.g., missing fields, poorly designed layout, or requiring users to enter IDs manually instead of selecting names).
<b>40 – 49%</b>	Forms are <b>partially implemented</b> but <b>lack essential functionality</b> (e.g., do not correctly insert/update records).
<b>35 – 39%</b>	A basic attempt at forms exists, but they are <b>mostly non-functional or broken</b> .
<b>1 – 34%</b>	Forms are either <b>missing</b> or entirely unusable.

## Reports & Data Analysis (10 Marks)

Grade Band	Criteria
<b>80%+</b>	Reports are well-structured, correctly formatted, and <b>present key insights</b> (e.g., <b>membership statistics, revenue trends, instructor performance</b> ). Data is grouped and summarised properly.
<b>70 – 79%</b>	Reports are functional and show <b>useful business insights</b> , but formatting could be improved (e.g., missing summaries or minor layout issues).
<b>60 – 69%</b>	Reports contain relevant data but <b>lack advanced formatting</b> (e.g., missing totals, inconsistent layouts).
<b>50 – 59%</b>	Reports are present but <b>contain errors</b> (e.g., missing filters, incorrect aggregation of values).
<b>40 – 49%</b>	Reports are incomplete or do not display relevant data.
<b>35 – 39%</b>	A report attempt exists, but <b>it does not work as intended</b> .
<b>1 – 34%</b>	Reports are either <b>missing</b> or entirely incorrect.

### Additional Features & Functionality (10 Marks)

Grade Band	Criteria
<b>80%+</b>	<b>Advanced features</b> such as automated <b>alerts (e.g., membership renewal reminders, class capacity warnings)</b> or <b>automated reports</b> are implemented. Macros improve functionality.
<b>70 – 79%</b>	Some advanced features are implemented (e.g., alerts for overdue payments), but minor usability issues exist.
<b>60 – 69%</b>	The database includes <b>basic functionality</b> but lacks automation or <b>error handling</b> .
<b>50 – 59%</b>	A functional database exists but lacks quality-of-life features like <b>automatic calculations or meaningful automation</b> .
<b>40 – 49%</b>	The implementation is basic and lacks any user-friendly automation.
<b>35 – 39%</b>	A partial attempt is made but with <b>no meaningful additional features</b> .
<b>1 – 34%</b>	No meaningful extra features.