

Coursework Assignment Brief

Postgraduate

Academic Year 2020 - 2021

Module Title:	Advanced Databases	
Module Code:	CMP7214	
Assessment Title:	Assessment 1: online Quiz Assessment 2: Group Coursework with individual elements	
Assessment Identifier:		Weighting: 100%
School:	Computing and Digital Technology	
Module Co-ordinator:	Shereen Fouad	
Hand in deadline date:	Assessment 1: Staged – see table on Moodle Assessment 2: 12pm – 8 th of Jan 2021	
Return of Feedback date and format	20 working days from date of submission (see Moodle for details).	
Re-assessment hand in deadline date:	12pm Mid-day on Monday 26 th July 2021 Note: the reassessment work may be different.	
Support available for students required to submit a re-assessment:	Timetabled revisions sessions will be arranged for the period immediately preceding the hand in date	
NOTE:	At the first assessment attempt, the full range of marks is available. At the re-assessment attempt the mark is capped and the maximum mark that can be achieved is 50%.	
Assessment Summary	Assessment 1: online Quiz This assessment weighs 20% of the total mark. The quiz will run online for 20 minutes and will include questions on fundamental concepts of advanced database systems. Quiz will cover the following topics: Relational Database design and implementation concepts; SQL and Advanced SQL; Functional dependency and normalization. You must attempt all questions. Assessment 2: Database Project (Group Coursework + individual element)	

	<p>The purpose of this assessment is to give you experience with designing and implementing a relational database in order to meet specific business requirements. The class will be split into teams of 2 or 3.</p> <p>Each team will submit one comprehensive report detailing their database project, the database design schema and a collection of SQL scripts, all included in a single zip-file. The project has a total weighting of 80%, however, 25% of mark is awarded for the individual work</p>
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IMPORTANT STATEMENTS

Standard Postgraduate Regulations

Your studies will be governed by the BCU Academic Regulations on Assessment, Progression and Awards. Copies of regulations can be found at <https://icity.bcu.ac.uk/Academic-Services/Information-for-Students/Academic-Regulations-2018-19>

For courses accredited by professional bodies such as the IET (Institution of Engineering and Technology) there are some exemptions from the standard regulations and these are detailed in your Programme Handbook

Cheating and Plagiarism

Both cheating and plagiarism are totally unacceptable and the University maintains a strict policy against them. It is YOUR responsibility to be aware of this policy and to act accordingly. Please refer to the Academic Registry Guidance at <https://icity.bcu.ac.uk/Academic-Registry/Information-for-Students/Assessment/Avoiding-Allegations-of-Cheating>

The basic principles are:

- Don't pass off anyone else's work as your own, including work from "essay banks". This is plagiarism and is viewed extremely seriously by the University.
- Don't submit a piece of work in whole or in part that has already been submitted for assessment elsewhere. This is called duplication and, like plagiarism, is viewed extremely seriously by the University.
- Always acknowledge all of the sources that you have used in your coursework assignment or project.
- If you are using the exact words of another person, always put them in quotation marks.
- Check that you know whether the coursework is to be produced individually or whether you can work with others.
- If you are doing group work, be sure about what you are supposed to do on your own.
- Never make up or falsify data to prove your point.
- Never allow others to copy your work.
- Never lend disks, memory sticks or copies of your coursework to any other student in the University; this may lead you being accused of collusion.

By submitting coursework, either physically or electronically, you are confirming that it is your own work (or, in the case of a group submission, that it is the result of joint work undertaken by members of the group that you represent) and that you have read and understand the University's guidance on plagiarism and cheating.

You should be aware that coursework may be submitted to an electronic detection system in order to help ascertain if any plagiarised material is present. You may check your own work prior to submission using Turnitin at the [Formative Moodle Site](#). If you have queries about what constitutes plagiarism, please speak to your module tutor or the Centre for Academic Success.

Electronic Submission of Work

It is your responsibility to ensure that work submitted in electronic format can be opened on a faculty computer and to check that any electronic submissions have been successfully uploaded. If it cannot be opened it will not be marked. Any required file formats will be specified in the assignment brief and failure to comply with these submission requirements will result in work not being marked. You must retain a copy of all electronic work you have submitted and re-submit if requested.

Learning Outcomes to be Assessed:

1. Critically evaluate key theories underpinning advanced relational and non-relational database systems
2. Design and develop database system using advanced techniques
3. Apply advanced techniques to rationalise and optimise the database system.

Assessment Details:**Title:**

online Quiz + Database Project

Type:

Online Assessment + Coursework

Style:

Online test/quiz + Report

Assessment 1: online Quiz (individual task - weighted 20%)

Rationale:

The Quiz assessment is suitable for testing knowledge and understanding of the key concepts of advanced databases. Spreading the assessment work over the whole semester reduces pressure on students towards the end of the semester and allows time for feedback on earlier assessments to be received and incorporated into later assessments.

Description:

This assessment comprises one online Moodle quiz, weighted 20% of the module. The quiz questions will cover fundamental concepts of advanced database systems, including:

- Conceptual and logical design of relational Databases
- SQL and Advanced SQL
- Functional Dependency and Normalization

The online quiz will last (20 minutes), and students must attempt all questions online.

Assessment 2: Database project (group task - weighted 20% + individual task - weighted 20%)

Rationale:

This is a group coursework with recommended 2 to 3 students in each group. It is your responsibility to find your team members. As a group, you are required to design and implement a small relational database for a chosen business. The implementation should cover conceptual and logical design as well as SQL requests that populate and perform operations on the database. The project will weight 80% of the module. Each team will submit one comprehensive report detailing their database project, the database design schema and a collection of SQL scripts, all included into one zip-file. There are requirements below on

general design features that you need to include in your database. You are required to submit one item on behalf of the group. Your report and scripts should clearly list all the contributors (i.e. team members) as appropriate. Each student will be orally examined through a viva (Staged – see table on Moodle). Each individual will set aside a significant percentage of marks for showing an understanding of the work the group has submitted.

Description:

The World Represented by your Database

You are free to come up with your own ideas, but you will have to provide sufficient detail in analysis phase to determine that your project is substantial enough. Here are a few suggestions for such a database system. The suggestions should give you a reasonable idea of the complexity you should aim for, and the kind of description you need to provide.

- RETAIL APPLICATION DATABASE
- RAILWAY SYSTEM DATABASE
- HOSPITAL MANAGEMENT SYSTEM DATABASE
- RESTAURANT MANAGEMENT DATABASE
- HOTEL MANAGEMENT SYSTEM DATABASE
- SCHOOL MANAGEMENT SYSTEM DATABASE
- Use your imagination!

Ideally, you pick a domain where lots of data is already available. This can make your database more interesting to use and may make it easier to test various types of queries. However, the project challenge lies in the design of a comprehensive database with interesting relationships between the elements, and various complex queries to extract and update information. Lots of data does NOT substitute for lack of complexity. As long as you have enough data to demonstrate the effectiveness of your design, you're ok.

The Database Analysis (groupwork - 5%)

You need to provide a reasonably comprehensive description of the domain of the project. List your entities, attributes, relationship constraints as well as business rules and assumptions.

The Database Design (groupwork - 10%)

Create an **Entity-Relationship Diagram** of your project database using the Chen model diagram. Your database design should include (Minimum requirements):

- at least 8 interrelated entity sets, and at least 40 attributes (total),
- enough relationships to connect each entity set to at least one other entity set.
- be sure to indicate identifying attributes (primary keys)
- put relationship constraints (i.e., connectivity, cardinality and participation).
- one or more M:N relationships,
- one or more recursive relationship
- one or more multivalued attributes.

When you are confident you have a fully qualified diagram, it is **desirable** that you render your diagram using an E/R design tool, such as (<http://www.conceptdraw.com/en/products/cd5/main.php>) (this gives you a free trial for 30 days) or <http://drive.draw.io/> (There is an E/R style diagram under the "Software design"

templates). Alternatively, you can draw your diagram using a simple Microsoft word diagramming tools and shapes.

It is very important to discuss your ER design with your tutors. During **week 6** of the semester each team will submit a document detailing the domain of interest, the database analysis and your ER design description. Students will receive a formative feedback about the briefing report within a week.

The Database Normalization (groupwork - 10%)

Convert your ERD diagram to a relational database schema, i.e. a set of tables, each with appropriate attributes, a primary key, and appropriate foreign keys. A schema diagram for your database, with primary and foreign keys specified appropriately. This is one where every entity type in the diagram corresponds to a table. In this ERM you must have introduced bridging types, must have introduced the special implementation of the symmetric relationship, and must have introduced a handling of the multivalued attributes. Go through the normalization process to come up with a collection of tables that are in third normal forms. Primary and foreign keys should be specified appropriately.

Database Implementation - Table creation (groupwork - 5%)

It is basically quite straightforward and uses the CREATE TABLE command.

Use sensible value domains (data types) for the attributes in each table. You can stick to the sort of value domain used in examples in the Additional Notes or textbook, but of course you can branch out and look at the Reference Manual. Include appropriate constraints (e.g. primary key, foreign key, references, unique, not-null, default and check constraints). If you wish, you can add extra sorts of constraint.

Database Implementation - Getting Data into Tables (groupwork - 5%)

Populate your database with sample data to allow testing of the schema. Each table should have a minimum of three rows. You must also **exercise at least two of your constraints** (e.g. check and default constraints) being sure it correctly catches errors while allowing legitimate data. (Note: you do not need to test not null constraints.) You must turn in printouts of the results of these tests indicating that the SQL statements for your requirements worked correctly and that your constraints correctly allowed good data and caught bad data.

Database Implementation - Test SQL Queries (individual work- 25%)

I'd like you to show the operation of queries that test whether your tables work appropriately. Your queries aim to retrieve vital information that is important for the operation of your database application.

Each student will do the following:

- develop at least three queries about your database, addressing user's needs, and a correct implementation in SQL. Your SQL statements should require a variety of SQL capabilities such as various kinds of join, aggregate functions, order by, distinct, nested queries etc.
- Exploit at least one query or database optimization technique (clustering, partitioning OR indexing)

Oral examination (viva) (groupwork - 20%)

Each student will be orally examined though a viva organized with their group (Staged – see table on Moodle). Each individual will set aside a significant percentage of marks for showing an understanding of the work the group has submitted.

What to hand in:

- Each team will submit a comprehensive report detailing their database project, a database and a collection of SQL scripts, all included into one zip-file.
- A report of 3000 words (excluding SQL code chunks and figures) will be produced by the team and submitted by **12pm 8th January 2021**.
- Oral examination (viva) will take place online (
- Reports should include the following sections:
 - Cover page with title of the project; module code, title, coordinator name; student names and numbers; date.
 - Domain description - A paragraph in ordinary English explaining the world that the database describes.
 - Database analysis - An explanation of the world in the form of business rules. These basically encapsulate what the main entity types and relationships are, and characteristics of those relationships such as their uniqueness or not and mandatoriness or not.
 - Database design - A high-level, "conceptual" ERD describing your database using Chen notation.
 - Database normalization - A low-level, "logical" ERM. A relational schema for your database, with primary and foreign keys specified appropriately. Add comments as necessary to make it clear which are the special tables such as bridging tables and tables introduced to handle multivalued attributes. (This is to help the reader - to save them having to work it out from your conceptual and logical ERDs.). A list of the functional dependencies for your scheme and collection of normalized tables obtained through a normalization process.
 - The Database Implementation
 - A list of the SQL table creation commands you used plus commands for any extra actions such as adding constraints or changing table characteristics.
 - A list of the SQL Insert commands that aims to insert at least three records in each table.
 - A listing of your test commands/queries and, for the SELECT queries, a listing of their **output** (or part of the output if the output is very big). Divide your commands/queries into clearly labelled sections corresponding to what it is you're trying to test or retrieve. More credit will be given for meaningful queries which use two or more techniques to make something useful. Think about the kinds of queries that the business might find useful.
 - Your project should explain the query performance and planning.
 - Your project should exploit at least one query optimization technique.
 - Your project might test the concurrency control of your database by running the various queries in separate sessions, you can simulate the real-life operation of your enterprise.
 - Conclusions.
 - References (follow Harvard referencing style)
- **The team should also submit soft copies of their database implementation.**

For advice on writing style, referencing and academic skills, please make use of the Centre for Academic Success: <https://icity.bcu.ac.uk/celt/centre-for-academic-success>

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Workload:

For assessment 1 (online quizzes), the quiz takes a total of 20 minutes online.

For assessment 2 (Database project), a report of 3000 words (excluding SQL code chunks and figures) will be produced by the team.

A typical student would be expected to spend around 90 hours of private study to pass this assessment

Transferable skills:

- Communicate technical information.
- Problem solving
- Programming skills
- Analytical skills
- Team work
- Time management
- Project management
- Verbal and written communication skills

Marking Criteria:

The quiz form 20% of your overall module mark. You must attempt all questions. A marks breakdown will be shown next to each question. Marks are awarded for correctly answering quiz questions.

Table of Assessment Criteria and Associated Grading Criteria

Assessment Criteria □	1 In-class quizzes	2 Database Project			
LOs	1. Critically evaluate key theories underpinning advanced relational and non-relational database systems 2. Design and develop database system using advanced techniques 3. Apply advanced techniques to rationalise and optimise the database system.				
Task	In-class quizzes (Individual work)	DB analysis, design and normalization (groupwork work)	DB implementation and optimization (groupwork + Individual work)	Querying the DB (Individual work)	Report and viva (groupwork work)
Weighting:	20%	25%	15%	20%	20%
Grading Criteria 0 – 29%	Quiz result shows no understanding of advanced database concepts	The analysis and design are limited and seriously flawed.	Little or no attempt at creating tables Little or no attempt at populating the tables Little or no attempt at using optimisation techniques	Very few basic select statements	Not appropriately structured with main sections missing. Report shows no understanding of the project.
30 – 39%	Quiz result shows poor knowledge of advanced database systems	An attempt has been made to analyse and design the database, but appropriate methods of design were not used, and the results of the design may be incorrect or meaningless.	Basic tables created; inappropriate data types; Some tables populated but data may not be appropriate. Limited attempt at using optimisation techniques	Limited number of basic select statements using WHERE clause	Badly planned and/or some sections missing. Report shows little understanding of the project.

40 – 49%	Quiz result shows little understanding of advanced database concepts	A reasonable attempt has been made to analyse and design the database, a reasonable ERD has been presented, but no normalization has been done.	<p>Tables created with appropriate data types;</p> <p>Some tables populated with appropriate sample data or the tables populated with inappropriate data.</p> <p>Reasonable attempt at using at least one of the optimisation techniques e.g. Index, cluster, partition</p>	<p>Reasonable number of select statements using WHERE and GROUP BY/ORDER BY clauses or column aliases</p> <p>or set operations e.g. UNION</p>	<p>All required sections are covered, but structure is not well planned or major details are missing.</p> <p>Report shows reasonable understanding of the project.</p>
50 – 59%	Quiz result shows acceptable level of understanding of advanced database concepts	A reasonable attempt has been made to analyse and design the database, a reasonable ERD has been presented, and a reasonable DB normalization has been done.	<p>Tables created with appropriate data types; and/or primary and foreign keys included and/or check constraints included</p> <p>All the tables populated with appropriate and reasonable amount of sample data</p> <p>Good attempt at using at least two of the optimisation techniques e.g. Index, cluster, partition, and/or list of objects displayed</p>	<p>Good number of select statements using WHERE, GROUP BY/ORDER BY clauses, and/or column aliases and/or set operations e.g. UNION</p>	<p>Well planned with all required sections present, but with some details missing or not clearly explained.</p> <p>Report shows good understanding of the project.</p>

60 – 69%	Quiz result shows good knowledge of advanced database concepts	A Good attempt has been made to analyse and design the database, a good ERD has been presented, and a good DB normalization has been done.	<p>Tables created with appropriate data types; primary and foreign keys included; and/or check constraints included</p> <p>All the tables populated with appropriate with good amount of sample data</p> <p>Very good attempt at using the optimisation techniques e.g. Index, cluster, partition, and/or list of objects displayed</p>	Very good number of select statements using WHERE, GROUP BY/ORDER BY clauses, and/or column aliases, and/or set operations e.g. UNION, and/or AND/OR; and/or JOIN; and/or use of aggregate functions e.g. SUM()	<p>Well planned and clearly formulated with all required sections present, but with some minor details missing.</p> <p>Report shows very good understanding of the project.</p>
70 – 79%	Quiz result shows very good knowledge of advanced database concepts	A very good attempt has been made to analyse and design the database, a very good ERD has been presented, and a very good DB normalization has been done.	<p>Tables created with appropriate data types; primary and foreign keys included; check constraints included; and/or the use of database objects</p> <p>All the tables populated with appropriate with very good amount of sample data</p> <p>Excellent attempt at using a variety of all the optimisation techniques e.g. Index, cluster, partition, and/or list of objects displayed</p>	Excellent number of select statements using WHERE, GROUP BY/ORDER BY clauses, and/or column aliases, and/or set operations e.g. UNION, and/or AND/OR; and/or JOIN; and/or use of aggregate functions e.g. SUM(), and/or string functions.	<p>Very well planned, clearly presented and supported with references.</p> <p>Report shows very good understanding of the project.</p>

80 – 89%	Quiz result shows excellent knowledge of advanced database concepts	An excellent attempt has been made to analyse and design the database, an excellent ERD has been presented, and an excellent DB normalization has been done.	<p>Tables created with appropriate data types; primary and foreign keys included; check constraints included; use of database objects advanced features such as nested tables</p> <p>All the tables populated with appropriate with excellent amount of sample data</p> <p>Outstanding attempt at using a variety of most of the optimisation techniques e.g. Index, cluster, partition, and list of objects displayed</p>	Outstanding number of select statements using WHERE, GROUP BY/ORDER BY clauses, and column aliases, and set operations e.g. UNION, and AND/OR; and use of aggregate functions e.g. SUM(), and string functions, and/or nested queries	<p>Excellent, complete, clearly presented professional work supported with references.</p> <p>Report shows excellent understanding of the project.</p>
90 – 100%	Quiz result shows excellent knowledge and exceptional understanding of advanced database concepts	<p>An excellent attempt has been made to analyse and design the database, an excellent ERD has been presented, and an excellent DB normalization has been done.</p> <p>Professional DB design with high standards.</p>	<p>Tables created with appropriate data types; primary and foreign keys included; check constraints included; use of database objects various advanced features such as nested tables.</p> <p>Tables populated with appropriate/ realistic data e.g. date uses date type, monetary values uses a numeric type, text values use a char type, data consistent with the case study.</p> <p>Outstanding attempt at using a wide variety of all the optimisation techniques e.g. Index, cluster, partition, and list of objects displayed</p>	Outstanding number of select statements using WHERE, GROUP BY/ORDER BY clauses, and column aliases, and set operations e.g. UNION, and AND/OR; and use of aggregate functions e.g. SUM(), and string functions, and/or nested queries, demonstrating mastery of the using querying techniques.	Outstanding, complete, clearly presented professional report, reflecting a complete understanding of the project.

Submission Details:

Format:

Assessment 1: Online quiz

Assessment 2: Report should be in PDF or Word format, database and queries and SQL scripts. These should be included into one zip-file.

Regulations:

- The minimum pass mark for a module is 50%
- Re-sit marks are capped at 50%

Full academic regulations are available for download using the link provided above in the IMPORTANT STATEMENTS section

For IET accredited courses ONLY (delete if required)

- For modules with multiple items of assessment, you must achieve a minimum of 40% in each item of assessment in order to pass the module.
e.g. assessment 1 - coursework 50% and assessment 2 - Exam 50%,
You must achieve an aggregate mark of 50% **WITH** every single assessment having a minimum mark of 40% or greater. For example if you achieved 90% in example assessment 1 and 20% in example assessment 2, the aggregate would be over 50% $((90+20)/2 = 55\%)$, however you will still fail the module due to the 40% qualifying rule.

Late Penalties

If you submit an assessment late at the first attempt then you will be subject to one of the following penalties:

- if the submission is made **between 1 and 24 hours** after the published deadline the original mark awarded will be reduced by **5%**. For example, a mark of 60% will be reduced by 3% so that the mark that the student will receive is 57%. ;
- if the submission is made between **24 hours** and **one week (5 working days)** after the published deadline the original mark awarded will be reduced by 10%. For example, a mark of 60% will be reduced by 6% so that the mark the student will receive is 54%.
- **if the submission is made after 5 days following the deadline, your work will be deemed as a fail and returned to you unmarked.**

The reduction in the mark will not be applied in the following two cases:

- the mark is below the pass mark for the assessment. In this case the mark achieved by the student will stand
- where a deduction will reduce the mark from a pass to a fail. In this case the mark awarded will be the threshold (i.e. 50%)

Please note:

- **If you submit a re-assessment late then it will be deemed as a fail and returned to you unmarked.**

Feedback:

Provide information on how feedback will be provided for each assessment and format

Marks and Feedback on your work will normally be provided within 20 working days of its submission deadline.

Where to get help:

Include any surgery hours or individual tutor availability

Students can get additional support from the library support for searching for information and finding academic sources. See their iCity page for more information:

<http://libanswers.bcu.ac.uk/>

The Centre for Academic Success offers 1:1 advice and feedback on academic writing, referencing, study skills and maths/statistics/computing. See their iCity page for more information: <https://icity.bcu.ac.uk/celt/centre-for-academic-success>

Link to My Assignment Planner tool: <http://library.bcu.ac.uk/MAP2/freecalc-mail/>

Fit to Submit:

Are you ready to submit your assignment – review this assignment brief and consider whether you have met the criteria. Use any checklists provided to ensure that you have done everything needed.

Staff to include any checklists here, or alternatively a link to ones found on Moodle.

Assignment Checklist

Run through this simple tick list before submitting your work!

Report

Well prepared materials make your work look more professional and easy to understand.

Item	Action	Done?
1	I have used the spellchecker and proofread the report correcting errors several times.	
2	I have checked that all material is directly related to the assignment tasks.	
3	I have checked that all the required information has been included in the report.	
4	The report is professionally presented using consistent headings, fonts and layout.	
5	All tables and images are numbered and captioned.	
6	I have used the report structure specified in the assignment.	
7		
8		

Referencing and Originality

Your work will be subjected to checks to ensure it is not derivative of other works. Works found to be derivative may leave you subject to penalties, including in extreme cases, expulsion from the University.

Item	Action	Done?
1	All images and tables are fully referenced	
2	I have not copied any material from anywhere else. All sentences have been paraphrased into my own words.	
3	All references appear in the references section at the end of the presentation.	
4	All references are cited in the text in the form of (author, year). See https://www.bcu.ac.uk/library/services-and-support/referencing for more details.	
5	If I have used quotes, these are fully referenced, appear in quotation marks and form only a small part of my report.	

Content

Is your work complete? Have you included all the required elements?

Item	Action	Done?
1	I have given an analysis of problem..	
2	I have explained why I chose the strategic tools that I have used and used references to support my decisions.	