 School of Computing and Creative Technologies

**Assessment Specification**

## Module Details

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| **Module Code** | UFCFU3-15-3 |
| **Module Title** | Advanced databases |
| **Module Leader** | Dr. Trupti Padiya |
| **Module Tutors** | Dr. Elias Pimenidis, Dr. Sondess Missaoui, Dr. Paul Jackson |
| **Year** | 3 |
| **Task** | Portfolio |
| **Total number of assessments for this module** | 1 |
| **Weighting** | 100% |

## Dates

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| --- | --- |
| **Date issued to students** | 06/02/2025 |
| **Date to be returned to students** | 16/05/2025 |
| **Submission Date** | 03/04/2025 |
| **Submission Place** | Blackboard |
| **Submission Time** | Before 14:00 |
| **Submission Notes** | If a student's submission is not clear, we may ask the student to demonstrate their work in person to provide them the benefit of the doubt. This will be arranged with one of the members of the module team. |

## Feedback

|  |  |
| --- | --- |
| **Feedback provision will be** | Formative feedback will be provided during lab sessions and summative feedback will be provided via blackboard. |

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# Section 1: Overview of Assessment

This assignment assesses the following module learning outcomes:

**MO1** Design and Implement Prototypes of Database Systems that serve the needs of Real World problems with complex data, addressing the requirements efficiently and effectively.

**MO2** Critically evaluate database systems as to risk and safety of data stored in them and the way such data is accessed and processed. In doing so, demonstrate thorough knowledge of the ethical and legal challenges surrounding the storage of a wide range of data types.

The assignment is worth **100%** of the overall mark for the module.

Broadly speaking, the assignment requires you to: Design and implement one relational database using the provided data and write queries to answer 5 questions. Subsequently, design and implement a NoSQL database for the same provided data and write relevant queries to answer the same 5 questions. Finally, write a short critical essay on topic(s) of your choice from some of the topic areas that are taught in the module.

The assignment is described in more detail in section 2.

This is an **individual** assignment.

Working on this assignment will help you to design and implement prototype of database system and critically evaluate the system concerning different aspects useful in solving real-world problems.

# Section 2: Task Specification

Using the data provided, design and implement one relational database and write queries to answer 5 questions. Subsequently, design and implement a NoSQL database and write relevant queries to answer the same 5 questions. Finally, write a short critical essay on topic of your choice from the following topic areas that are taught in the module: 1) Temporal databases, data warehousing, 2) graph databases, 3) Personal Data, Legislation & Risk Assessment,4) Big data - Data lakes 5) Data Security

**Case scenario:**

The provided spreadsheet contains snapshot of the mock data of people which includes name, address, email, date of birth, their favourite things, details about their neighbours etc. Considering the provided data, complete the following tasks.

**Task 1 (35 Marks)**

* + Normalize the data to 3NF. Show the process taking the data from its current un-normalised form through to 1NF, 2NF, and finally 3NF. For each NF, state the rules that you have applied and show how the data groups develop. For each NF you are expected to show all the data groups, regardless of whether they have changed or not. Note that, if you feel that the data satisfies a specific Normal Form you have to discuss and prove it by applying the criteria. You cannot just state it.
  + Develop a fully annotated ER diagram
  + Implement the database using an SQL based database enforcing all necessary integrity constraints. Populate the database with the data provided.
  + Write SQL queries for the following:
* Display person's name and their age in years
* Group Persons by their favourite drink and return average age of each group
* Display average age of people who likes Hiking
* Display the total number of people from each City and sort it in ascending order by total number of people
* Display name of person(s) whose neighbour is neighbour C

*NOTE: For each item of implementation, you are required to show the snapshots of code and the result produced.*

**Task 2 (35 Marks)**

* Produce a NOSQL model of the solution and implement the database based on this model. Populate the database using the data provided and split in the structure shown by the model. Show the model diagrammatically, show the code to generate the database and to populate the database. Provide evidence that the database has been populated.
  + Write NOSQL queries for the following
* Display person's name and their age in years
* Group Persons by their favourite drink and return average age of each group
* Display average age of people who likes Hiking
* Display the total number of people from each City and sort it in ascending order by total number of people
* Display name of person(s) whose neighbour is neighbour C

*NOTE: For each item of implementation, you are required to show the snapshots of code and the result produced.*

**Task 3 – 30 marks**

From the lecture topics: 1) Temporal databases, data warehousing, 2) graph databases, 3) Personal Data, Legislation & Risk Assessment,4) Big data - Data lakes 5) Data Security, choose ones that suitably applies to this case scenario and critically discuss its impact on the database. Address design issues, performance business requirements, legal issues, or security. Critically assess the impact of the topic they could have on the database system that would serve the business. Consult literature and use 4-6 references to support your comments. The length of this discussion should not exceed 800 words (Excluding references).

# Section 3: Deliverables

You must submit three different PDF files, one for each Task. Please do not put the files together in one zipped folder.

For Task 1 and Task 2 you must submit everything that is required in the order that is presented in this document; text, diagrams, screenshots evidencing the creation and population of the database, screenshots (not text) of code created and run, screenshots of the outcomes obtained after running the code. For Task 3, you will need just the text of the essay with a list of references converted in PDF format.

Please write about your assumptions (if any) or rationale for your tasks. Note, references do not contribute towards the wordcount. It is your responsibility to ensure your submitted pdf file(s) displays all your work correctly.

|  |  |  |
| --- | --- | --- |
| Item | Detail | Date & Submission Mechanism |
| 1  2  3 | Task1\_<your student number>.pdf  Task2\_<your student number>.pdf  Task3\_<your student number>.pdf | Before 14:00 on 03/04/2025 via Blackboard |

Note: If the student’s submission is not clear, we may ask the student to demonstrate their work in person to provide them the benefit of the doubt. This will be arranged with one of the members of the module team.

# Section 4: Marking Criteria

*Your assessment will be marked according to the following marking criteria.*

**Task 1: Normalisation, ERD, Implementation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0-2 marks** | **3-5 marks** | **6-8** | **9-12** | **13-15** |
| No or little evidence of normalization.  The normalization is incomplete and this affects the ERD and the subsequent implementation | Some of the NFs appear correct, but the overall outcome bears errors.  The ERD is incomplete or lacking annotation.  The implementation suffers from errors in the design. | At least the normalisation is correct with all normal forms.  The ERD might display some errors (e.g. lack of referential integrity). These could affect the implementation and can impact the efficiency of the database. | Normalisation correct with all three NFs.  The ERD shows the correct entities. There might be some issues with the fully annotated status of the ERD.  Most of the inserted data is correct and referential integrity is fully supported. | Normalisation is correct with all 3NFs.  The ERD reflects the outcome of the Normalisation correctly. It is fully annotated.  Referential integrity is fully observed.  All data has been uploaded on a database that fully reflects the design structure. |

**Task1: Queries**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0 marks** | **1 marks** | **2 marks** | **3 marks** | **4 marks** |
| No code is submitted OR Code is incomplete and does not run | Code appears to be structurally correct but execution is problematic | Code is technically correct, runs but yields an incorrect result | Code runs and produces a correct result. The code is complex and computationally expensive | Code is lean, computationally efficient. The result obtained is accurate. |

**Task 2: Design and implementation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0-2 marks** | **3-5 marks** | **6-8** | **9-12** | **13-15** |
| No or little evidence of a NoSQL model shown.  And/or the justification of what is provided is poor  Data is dumped into the MongoDB platform as originally provided | A model has been provided but the justification is not convincing.  The data loaded onto the database might not reflect the detail of the model accurately. | A reasonable model has been developed.  There is an effort to justify this, but might not be clear.  The database and the structure loaded might not reflect the model accurately. | A good model has been developed.  It has been justified well based on the case and the detail of the data provided.  A database has been implemented based on the model and the data is loaded accordingly.  The efficiency of the database might not fully observe the business needs of the case. | The model, justification, and implementation are correct and show potential of an efficient data processing tool. |

**Task2: Queries**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0 marks** | **1 marks** | **2 marks** | **3 marks** | **4 marks** |
| No code is submitted OR Code is incomplete and does not run | Code appears to be structurally correct but execution is problematic | Code is technically correct, runs but yields an incorrect result | Code runs and produces a correct result. The code is complex and computationally expensive | Code is lean, computationally efficient. The result obtained is accurate. |

**Task 3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0-6 marks** | **7-11 marks** | **12-18** | **19 -24** | **25-30** |
| A very limited discussion, with no attempt to justify the relevance to the case | An attempt to justify why the topic is relevant to the case has been made.  The discussion is brief, might lack criticality, and may lack support from appropriate references. | The choice of topic is suitably justified.  The discussion is of suitable length.  The is some effort to analyse critically.  There is a limited support by appropriate references. | The is a very good level of critical discussion. The topic is suitably linked to the case.  The text is properly cited using current and high-quality references. | The discussion has evolved into a mature critical discussion. The choice of references, the appropriateness of citations and level of analysis are of publishable standard. |

# Section 5: Feedback mechanisms

Formative feedback will be provided during lab sessions and summative feedback will be provided via blackboard.

# Section 6: Appendices

## Completing your assessment

**Where should I start?**

All taught topics contribute to the completion of this coursework portfolio. The first four weeks of teaching support the technical part of the portfolio, design, implementation and queries. The rest of the topics provide the necessary background to support your choice and completion of the essay.

**What do I need to do to pass?**

Refer to the marking criteria and achievement of the minimum mark, a mark of 40% or above.

**How do I achieve high marks in this assessment?**

Refer to the assessment criteria and the characteristics of work that achieves a 2:1 or 1st.

**How does the learning and teaching relate to the assessment?**

The first four weeks of teaching support the technical part of the portfolio, design, implementation and queries. The rest of the topics provide the necessary background to support your choice and completion of the essay.

**What do I do if I am concerned about completing this assessment?**

UWE Bristol offer a range of Assessment Support Options that you can explore through [this link](https://www.uwe.ac.uk/study/academic-information/personal-circumstances), and both [Academic Support](https://www.uwe.ac.uk/study/study-support/student-support-advisers) and [Wellbeing Support](https://www.uwe.ac.uk/life/health-and-wellbeing/get-wellbeing-support) are available.

For further information, please see the [Academic Survival Guide](https://www.uwe.ac.uk/study/academic-information/academic-survival-guide).

## Assessment Offences

**How do I avoid an Assessment Offence on this module? 2**

Use the support above if you feel unable to submit your own work for this module.

The most common Assessment Offence is that of using and submitting someone else’s work for assessment, whether the other person is aware of this or not.

UWE Bristol’s [UWE’s Assessment Offences Policy](https://www.uwe.ac.uk/study/academic-information/assessments/assessment-offences) requires that you submit work that is entirely your own and reflects your own learning, so it is important to:

* + Ensure you reference all sources used, using the [UWE Harvard](https://www.uwe.ac.uk/study/study-support/study-skills/referencing/uwe-bristol-harvard)/[OSCOLA](https://www.uwe.ac.uk/study/study-support/study-skills/referencing/oscola) system and the guidance available on [UWE’s Study Skills referencing pages](https://www.uwe.ac.uk/study/study-support/study-skills/referencing).
  + Avoid copying and pasting any work into this assessment, including your own previous assessments, work from other students or internet sources
  + Develop your own style, arguments and wording, so avoid copying sources and changing individual words but keeping, essentially, the same sentences and/or structures from other sources
  + Never give your work to others who may copy it
  + If an individual assessment, develop your own work and preparation, and do not allow anyone to make amends on your work (including proof-readers, who may highlight issues but not edit the work) and

**When submitting your work, you will be required to confirm that the work is your own,** and text-matching software and other methods are routinely used to check submissions against other submissions to the university and internet sources. Details of what constitutes plagiarism and how to avoid it can be found on UWE’s Study Skills [pages about avoiding plagiarism](https://www.uwe.ac.uk/study/study-support/study-skills/reading-and-writing/plagiarism).

## Assessment Content

In line with UWE Bristol’s [Assessment Content Limit Policy](https://www.uwe.ac.uk/about/structure-and-governance/policies) (formerly the Word Count Policy), word count includes all text, including (but not limited to): the main body of text (including headings), all citations (both in and out of brackets), text boxes, tables and graphs, figures and diagrams, quotes, lists.

## Use of AI in assessment:

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|  | Gen AI can be used for research or for checking spelling and grammar, but not for designing, writing or implementing your tasks. |

**Guidance on Referencing (inc AI):**

Please note that the aim of referencing is to demonstrate you have read and understood a range of sources to evidence your key points. You need to list the references consistently and in such a way as to ensure the reader can follow up on the sources for themselves.

We require UWE Harvard Referencing for any sources you may use in this assessment. Please note that this assessment is mainly based on practical tasks and referencing is not the main focus. Further information on the [UWE Harvard Referencing style](https://www.uwe.ac.uk/study/study-support/study-skills/referencing/uwe-bristol-harvard).