



Module name and code	Database Systems Development, 5BUIS009C
CW weighting	40%
CW number and title	CW1 Refer/Defer
Lecturer setting the task with contact details and office hours	Dmitriy Pochitaev dpochitaev@wiut.uz Mon 13:00-14:00
Submission deadline	TBD
Results date and type of feedback	written feedback
The CW checks the following learning outcomes:	
<ol style="list-style-type: none"> 1. Explain the fundamental concepts of the relational model; 2. Relate the conceptual and logical world and vice versa, with the aid of mapping; 3. Validate and improve a logical data model with the aid of functional dependencies; 	

Task

This is an individual coursework.

This course work consists of two parts: report and practical work.

In this piece of academic work, you are asked to select a real life case study from **local** businesses (case study selection instructions could be found in Appendix A.) and employ EER design constructs. Your task is to produce a Conceptual Data Model (using Enhanced ER model constructs) and map it to an equivalent logical representation. After that, you will need to validate your logical DB model with the aid of functional dependencies. You will further need to implement the logical representation on top of a particular DBMS and populate it with sample data.

Detailed description of the task

1. Write a report (70%)

1. State all the requirements that you managed to identify and that are relevant for a database design. (10 marks).
2. Produce Enhanced ER diagram. It should contain at least 8 and maximum 15 entities. Diagram must include:
 - At least one subclass/superclass hierarchy.
 - One example of multivalued attribute.

- One example of composite attribute.

Show relationship names and multiplicity constraints for all the relationships. For subclasses/superclasses show participation and disjointness constraints. (22 marks).

3. Map EER diagram to relational model and explain mapping options selection. Results of mapping should be presented in a form of relational database schema diagram, preferably use the diagramming tool that MS SQL Server provides. Explanations must include:
 - Mapping of subclasses/superclasses, clearly explain why certain mapping option was selected.
 - Mapping of multivalued attribute(s).

Your explanations should be detailed and accurate to get full mark. (20 marks).

4. Validate relational database model that you produced with the aid of functional dependencies (FDs). You will need to check if all the relations in your relational schema are at least in 3NF. If there are no FDs that violate 3NF you will need to modify your case study with appropriate assumptions that will allow to produce **one FD that violates 3NF** (15 marks).
 - Identify FDs that violate 3NF. For each FD, that violates certain normal form, provide detailed explanations why and what normal form it violates.
 - If you will not be able to find any FDs that violate 3NF, add relevant assumptions/requirements to you case study that will allow to produce one FD that violates 3NF. Provide detailed explanations what assumption you have added, why it produces FD that violates normal form, and what NF it violates.
 - Normalize your relational schema to 3NF. Explain all the steps.

2. Practical part (30%) (You should use MS SQL Server DBMS for practical part.)

1. Produce SQL DDL statements that will create all the tables in your database. Note you should enforce as many constraints as possible by means provided by SQL DDL (referential integrity, entity integrity, and enterprise constraints).
(18 marks)
2. Populate tables with adequate sample data (you should use SQL DML statements).
(8 marks)
3. Provide SQL statements that will delete all the tables in your database (drop table statements for each table in your database). Tables must be deleted in a correct sequence so that no errors should be displayed when delete statements are executed.
(4 marks)

Include SQL produced in this steps 1, 2, and 3 in the appendix section of your report. Use font `Courier New` for SQL statements.

Your work must be properly referenced. All sources including material from the web must be acknowledged.

Submission requirements

Coursework *must be submitted electronically through the Intranet system*. Name your report file according to the following pattern:

DBSD.CW1.IDnumber.docx

Example: **DBSD.CW1.5678.docx**

Do not include leading zeroes in your Id. Submit this file through the Intranet submission system.

General notes

Please ensure that you work individually on this coursework. Plagiarism and close collaboration will not be tolerated and it will be considered an assessment offence. According to Essential Information Handbook of Academic Regulations, any students may be invited for oral viva. (Please, see the regulations for full details)

Check that the CW has a standard cover page, table of contents, page numbers and bibliography. Your name should not appear on the cover page or anywhere else. Put your ID number on the cover page and on every other page.

This is your responsibility to put CW through the anti-plagiarism software before submission.

Generative AI notes

Generative AI usage is not allowed, you should do all the work yourself. In case of any suspicions in close collaboration or use of AI tools you will be invited to the viva.

Appendix A Case study selection instructions:

You should choose one of existing local businesses and decide on the type of the system to be modeled. Make sure to provide a short case study description.

Also take into account that the selected system should allow you to develop a reasonably complex database (at least 8 entities in ER diagram but not more than 15).

In your report you should provide a description of the selected case study. If you have any questions/difficulties with the selection of the case study, please contact your tutor for advice.