



## ASSIGNMENT TOP SHEET

Faculty of Creative Arts, Technologies & Science  
Department of Computer Science and Technology

Student Ref. No:

Unit Code

**CIS017-1 / CIS095-1**

Unit Name

**Computer Systems Structure  
Database and Computer Networks**

Deadline for Submission(s)

**Friday, 28 March 2023  
10:00am**

Student Name:

Unit Team

**Sue Brandreth**

**Assignment Details:**

**Assignment 1 – Design and Implement a Database**

### Instructions to Students:

#### Please note:

Work presented in an assessment must be your own. Plagiarism is where a student copies work from another source, published or unpublished (including the work of another student) and fails to acknowledge the influence of another's work or to attribute quotes to the author. Plagiarism is an academic offence and the penalty can be serious. The University's policies relating to Plagiarism can be found in the regulations at <http://www.luton.ac.uk/livingandstudying/ga/documents>. To detect possible plagiarism we may submit your work to the national plagiarism detection facility. This searches the Internet and an extensive database of reference material including other students' work. Once your work has been submitted to the detection service it will be stored electronically in a database and compared against work submitted from this and other universities. It will therefore be necessary to take electronic copies of your materials for transmission, storage and comparison purposes and for the operational back-up process. This material will be stored in this manner indefinitely.

**I have read the above information and I confirm that this work is my own and that it may be processed and stored in the manner described.**

**Signature (Print Name):** ..... **Date:** .....

Extension deadline

MITIGATION TEAM agrees that the assignment may be submitted \_\_\_\_ days after the deadline and should be marked without penalty.

MITIGATION TEAM confirmation.....

**All assignments must be electronically submitted using Turnitin (via BREO) by 10am on the due date.**

Please leave sufficient time to meet this deadline and do not leave the handing-in of assignments to the last minute. You need to allow time for any system problems or other issues.

## CIS017-1 -Computer Systems Structure

## CIS095-1 – Databases and Computer Networks

### Assignment 1 – Design and Implement a Database

Assignment 1 requires you to design and implement a relational database for the given scenario.

This is an individual assignment and each student should work independently and submit their assignment as an individual piece of work.

You should read this assignment brief very carefully, and, if it is not clear what you are asked to do, you should seek clarification.

Assignment 1 is worth 30% of the total unit mark.

**The following Learning Outcomes will be addressed in this assignment:**

- 1 Demonstrate the following knowledge and understanding:
  - Comprehend the underpinning technologies of data communications and computer networking while appraising the basic system structures and the principles around data modification.
- 2 Demonstrate the following skills and abilities:
  - Utilise problem-solving skills to put together information from different sources in order to design, develop and implement a databases or computer network.

**In order to pass Assessment 1 you will need to:**

- Investigate a given business-related case study / scenario
- Determine the database requirements for the scenario
- Apply conceptual / logical modelling techniques to create an Entity Relationship Model and a fully normalised set of tables
- Implement and modify a database using a set of SQL commands.
- Edit and manipulate database records based on requirements given to you
- Successfully detect, describe and analyse the main cause of faults within data structures.

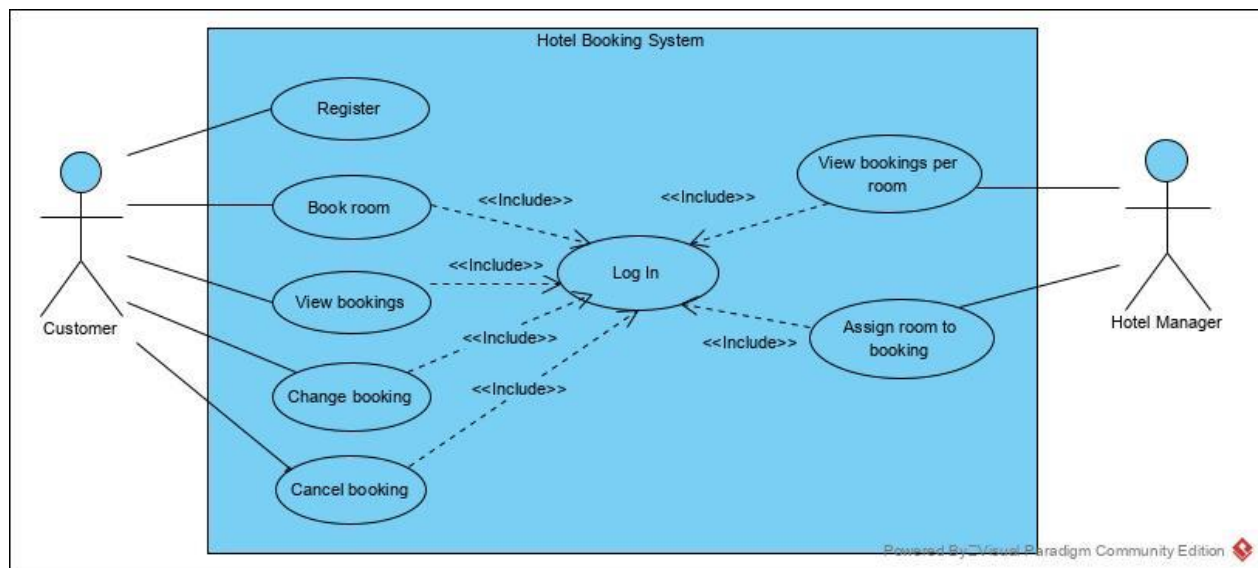
### Case Study

Consider the following scenario:

A hotel would like to provide an online service for customers to book rooms and to check their upcoming trips. A database needs to be created to store customer data (name, address, email, telephone number) and booking information (start and end date, double or single room) as well

as room information, indicating whether a room is a single or double room. Each booking must be assigned to exactly one single or double room as indicated in the booking.

Customers who are not registered yet need to register (providing their address, phone number, email address and credit card information). A registered customer should be able to book a room, ie. provide the check-in and check-out date and if a double or single room is required. Customers should also be able to view their bookings and change or cancel them if needed. All these operations are only possible after a customer signs in (which means they must be registered). Your system should also check if the requested room (single or double room) is available for the time of stay. After a booking is made, hotel managers must assign an appropriate room to each booking, matching the customer's demand regarding single or double room. To determine whether a room is available during the requested time period, the hotel manager should be able to see existing bookings per room. Hotel managers must also sign in before any operation can be performed.



**Figure 1: Hotel Booking System Use Case Diagram**

As a guide, the functionality of the **Hotel Booking System** is shown in the Use Case Diagram in Figure 1, taking the different user roles (customer and hotel manager) into account.

## Tasks

### 1. Entity Relationship Model (ERM)

Create an Entity Relationship Model (ERM) for the Hotel Booking System.

You are allowed to use any ERM modelling notation but it is suggested that you use a version of the Oracle ERM notation as described during the Unit's lectures.

It also is suggested that you create your ER Diagram using Visual Paradigm Community Edition software which is a free download. You should not use Visio or equivalent software.

Your ER Diagram should include all identified entities and the relationships between them. Relationship should include consideration of both cardinality and optionality, and a textual description of each relationship should be included.

You should also create a list of your Entities.

Primary and Foreign keys and other attributes for each entity should be included in this list.

Your Entity Relationship Model should be included in your report.

### 2. Normalisation

Create a normalized set of tables for the scenario for the given data. The steps in the normalization from UNF to 3NF should be shown.

Your set of normalized tables should be included in your report.

### 3. Physical Table Design (including Data Dictionary)

You should now be able to create a list of the tables to be implemented in your selected RDMS.

Create a set of 'Skeleton tables' which should show the table name, primary key field, foreign key field(s), and all other attributes. (This will be RDMS system independent).

Create a Data Dictionary for all tables and attributes.

For each attribute show the datatype, length, and other properties. You may want to include any other information such as data entry constraints.

The Data Dictionary should be part of your physical design ie. dependent on the selected RDMS.

Your skeleton tables and data dictionary should be included in your report.

## 4. Implementation of the Database

For this last practical task, you can use almost any RDMS – MySQL, SQLite, Oracle, Oracle Application Express (APEX) but you should not use MS Access.

Write SQL statements to create your database and table structure including Primary Key and Foreign Key constraints.

Write SQL statements to insert at least two rows of data in each table. Further records can be added manually.

You should create screenshots of the implementation to show the successfully created tables – structure and data, and the results of running your queries.

It may be possible (depending on platform and version) to also produce a screenshot of the set of tables created with the relationships between them.

## 5. Query Design and Implementation

Use your SQL skills to design a set of relevant SQL queries and demonstrate your knowledge of SQL. Five (5) or six (6) queries will be sufficient but should include querying from multiple tables, using aliases, summary queries and grouping. The more complex and relevant the query is the more marks you are likely to achieve.

Write SQL statements to create the queries you have designed. Run and test the queries.

Your SQL queries should be included in your report, and you should include an explanation of the purpose of the query.

## 6. Report

You will need to submit a word-processed report with evidence, explanation and discussion of the above tasks.

This must be a professionally presented report with appropriate headers and footers (including filename, page numbers) and heading and subheadings. Any diagrams included must have a figure number and caption. A table of contents is optional.

Suggested sections are:

Introduction

Scenario

Tasks:

- Entity Relationship Model
- Normalization

- Physical Table Design (including Data Dictionary)
- Implementation of the Database
- Query Design and Implementation
- Discussion / Critical Analysis / Reflection

Your final report should be uploaded to the appropriate link on BREO before the deadline of **Friday 28 March, 2023 10:00am**

## Deliverables

1. Assignment Report (maximum 10 pages with Appendices if required)
2. In-class demonstration of your database implementation  
Please note that due to the difficult circumstances resulting from COVID-19 this may not be possible, and alternative method to demonstrate your application may be required.

## Grading:

### Marking Grid

	G	F	E	D	C	B	A
	0	1 - 34	35 - 39	40 - 49	50 - 59	60 - 69	70 - 100
<b>Entity Relationship Model (ERM) (20%)</b>	No submission.	Poor. Little discernible merit.	Entity Relationship model created but not correct.	Entity Relationship Model created but some errors.	Good attempt at creating an accurate Entity Relationship Model.	Very good attempt at creating an accurate Entity Relationship Model.	Excellent and accurate Entity Relationship model which fully meets the system requirements.
<b>Normalisation (20%)</b>	No submission.	Poor. Little discernible merit.	An attempt at creating a set of 3NF normalised tables but not correct.	An attempt at creating a set of 3NF normalised tables but some errors.	Good attempt at creating an accurate set of 3NF normalised tables.	Very good attempt at creating an accurate set of 3NF normalised tables.	Excellent and accurate set of 3NF normalised tables which fully meets the system requirements.
<b>Table Design (10%)</b>	No submission.	Poor. Little discernible merit.	An attempt at creating a set of skeleton tables and data dictionary but not correct.	An attempt at creating a set of skeleton tables and data dictionary but some errors.	Good attempt at producing an accurate set of skeleton tables and data dictionary.	Very good attempt at producing an accurate set of skeleton tables and data dictionary.	Excellent and accurate set of skeleton tables and data dictionary which fully meets the system requirements.
<b>Query Design (20%)</b>	No submission.	Poor. Little discernible merit.	An attempt at producing a set of basic SQL query designs but not correct.	An attempt at producing a set of basic SQL query designs but some errors.	Good attempt at producing an accurate but basic set of SQL query designs.	Very good attempt at producing an accurate set of SQL query designs.	Excellent and accurate set of SQL query designs which are relevant to the system requirements. Query designs demonstrate a range of complexity as specified.

<b>Database Implementation (20%)</b>	No submission.	Poor. Little discernible merit.	An attempt at implementation of the database design and SQL queries but not correct.	An attempt at implementation of the database and query designs but some errors.	Good attempt at implementation of the database and query designs.	Very good attempt at implementation of the database and query designs.	Excellent and accurate implementation of the database and query designs which fully meets the system requirements
<b>Report (10%)</b>	No submission	Poor. Little discernible merit.	Not structured and incomplete.	Basic structure and basic content showing some evidence and explanation of assignment tasks.	Good structure, and acceptable content showing evidence and explanation of assignment tasks.	Very good structure and content showing evidence, explanation and discussion of assignment tasks.	Excellent structure and content showing evidence, explanation and discussion of assignment tasks.

### Submission details:

The **report** should be uploaded as a **.doc**, **.docx** or **.pdf** file via the **Assignment 1 Report** submission link provided on BREO. It MUST be named with your **Student ID ie. Ass1\_12345**.

Submission of your report and your zipped program code must take place before **Friday 28 March, 2023 10:00am** using the appropriate link provided on BREO.

Capture and save evidence of submissions in a word document.

You may be asked to demonstrate that the work submitted is all your own work.

Please note that all submissions will be checked for similarity to other sources, and evidence of plagiarism may be severely penalised.