

**CIS017-1 – Computer Systems Structure**

**CIS095-1 – Databases and Computer Networking 2021-2022**

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

**INDIVIDUAL REPORT**

**Student ID: XXXXX Full Name XXXXXX**

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You will need to complete the Table of Contents and Page Nos manually

PLEASE NOTE THAT THIS IS A PROFESSIONAL REPORT

ALL SCREENSHOTS, DIAGRAMS, etc SHOULD BE GIVEN A FIGURE NUMBER AND A CAPTION AND AN EXPLANATION

CIS017-1 – Computer Systems Structure 2020-2021  
CIS095-1 – Databases and Computer Networking 2020-2021

Assignment 1 – Design and Implement a Database

Introduction/Overview

Why are you doing this work? What were you asked to do? What did you do? Were you successful?

Task Description

This is basically a description of the task and case study as on the Assignment 1 brief. You can paraphrase what is written on the Assignment 1 brief.

Tasks:

Conceptual / Logical Database Design

* Entity Relationship Model

An Entity Relationship Model consists of a Entity Relationship Diagram (ERD) and a list of Entities with their attributes, Primary Key and Foreign Keys.

Example:

**Booking** (BookingID, CustomerID\*, RoomiD\*, ManagerID\*, DateBooked, ArrivalDate, DepartureDate, BookingStatus, Paid)

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

You are STRONGLY ADVISED to use VISUAL PARADIGM CE to create your Entity Relationship Diagram. Visual Paradigm Community Edition software 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.

Remember: All diagrams / figures / screenshots need a Fig No, caption and explanation.

* Normalisation

Use a columnar format, for example:

Normalisation – Hotel Booking System

|  |  |  |  |
| --- | --- | --- | --- |
| **UNF** | **1NF** | **2NF** | **3NF** |
| **CustomerID** | **CustomerID** | **CustomerID** | **CustomerID** |
| Title | Title | Title | Title |
| FirstName | FirstName | FirstName | FirstName |
| LastName | LastName | LastName | LastName |
| EMail | EMail | EMail | EMail |
| MobileNo | MobileNo | MobileNo | MobileNo |
| Password | Password | Password | Password |
| Address1 | Address1 | Address1 | Address1 |
| Town | Town | Town | Town |
| County | County | County | County |
| PostCode | PostCode | PostCode | PostCode |
| PaymentMethod | PaymentMethod | PaymentMethod | PaymentMethod |
| RoomID |  |  |  |
| RoomType | **CustomerID** | **CustomerID** | **CustomerID\*** |
| FloorLevel | **RoomID** | **RoomID** | **RoomID\*** |
| DateBooked | **DateBooked** | **DateBooked** | **DateBooked** |
| ArrivalDate | RoomType | ArrivalDate | ArrivalDate |
| DepartureDate | FloorLevel | DepartureDate | DepartureDate |
| BookingStatus | ArrivalDate | BookingStatus | BookingStatus |
| Paid | DepartureDate | Paid | Paid |
| ManagerID | BookingStatus | ManagerID | ManagerID\* |
| FirstName | Paid | FirstName |  |
| LastName | ManagerID | LastName | **ManagerID** |
| EMail | FirstName | EMail | FirstName |
| MobileNo | LastName | MobileNo | LastName |
| Password | EMail | Password | EMail |
|  | MobileNo |  | MobileNo |
|  | Password | **RoomID** | Password |
|  |  | RoomType |  |
|  |  | FloorLevel | **RoomID** |
|  |  |  | RoomType |
|  |  |  | FloorLevel |

This needs a Table No and caption and a detailed explanation of how you go from UNF to 1NF,1INF to 2NF and 2NF to 3NF.

Physical Database Design (including Data Dictionary)

At this point you will have decided what database platform (RDMS) you will use – ie. Oracle, MySQL, SQLite.

This includes:

Skeleton Tables

List of tables with their attributes, Primary Key and Foreign Keys.

Example:

**Booking** (BookingID, CustomerID\*, RoomiD\*, ManagerID\*, DateBooked, ArrivalDate, DepartureDate, BookingStatus, Paid)

Data Dictionary (for each table)

Example:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Customer | | | | | | | |
| Description: Customer details | | | | | | | |
| Field Name | **Datatype** | **Length** | **Index** | **Null** | **Default** | **Validation rule** | **Description** |
| custid *(Primary)* | int (11)  unsigned | 11 | PK | No |  |  | Autoincremented Uniquely identifies every customer |
| firstname | varchar (30) | 30 |  | No |  |  | First name of customer |
| lastname | varchar (30) | 30 |  | No |  |  | Last name of customer |
| email | varchar (100) | 100 |  | No |  | Must be email format containing an @ and a ‘.’  Regex expression used | Email of customer |
| password | varchar (30) | 30 |  | No |  |  | Customer password |

Indexes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Keyname** | **Type** | **Unique** | **Column** | **Null** |
| PRIMARY | BTREE | Yes | custid | No |

[Note: I can’t get this positioned correctly! The original document is in the MISC folder on the left in BREO]

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

Take care with the datatypes as these vary from database system to database system.

Read the assignment brief for more details.

Implementation of the Database

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

YOU NEED TO STATE WHAT RDMS YOU ARE USING.

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

Write and execute 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.

Everything ie. SQL statements and output/result needs to be documented with screenshots or copy and pasted code.

Remember those Fig Nos, captions and explanations.

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.

You show include the purpose of each query in terms of relevance to the business and in the context of the given scenario. You also need to include and exaplain the code, and show the results of running the code

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

Execute SQL commands to create the queries you have designed. Run and test the queries.

Everything ie. SQL statements and output/result needs to be documented with screenshots or copy and pasted code.

Remember those Fig Nos, captions and explanations!

Discussion / Critical Analysis / Reflection

This part is important.

Basically, you are evaluating what you have done. Did you achieve all the required specification of the Assignment brief? If not, why not? Discuss the problems you encountered and how you overcame them.

Did you give yourselves enough time to accomplish this work? Was it harder than you expected? What have you learned from tackling this Assignment?

Did this work enhance your understanding of the database design and implementation programming language? Did it motivate you to learn more SQL and about NoSQL databases?

If you had to undertake this or something similar again would you tackle it differently?

What improvements or enhancements would you recommend for a future iteration of this project?

Conclusion

What were you asked to do? Did you achieve it?

References

Harvard Referencing System. Any reference must be cited in text

Appendix

If needed!

Anything else that you might want to include that does not fit well into the main report body.