## 

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SWE4203 Databases 2022

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## **INTRODUCTION**

This is a brief description of designing the BBK assignment.

Starting off, by creating and designing the Entity and Relationship Diagram and connecting or marking out all the connections between them, creating a relational data model by transferring most of the information from the diagram to excel tables and lastly mapping and normalising the ER diagram by following the rules of the process. The following is a reflection on the assignment and the thought process of how it was formed and worked on.

## **DATA MODELLING ENTITY RELATIONSHIP DIAGRAM**

The Entity & Relationships (ER) diagram is a process of creating a conceptual design that plays a key part in forming and creating a database system. The diagram consists of mainly entities, relationships and attributes that are used to explain how they all connect with each other in order to later form an effective and accurate database. The BBK diagram shows how various symbols are used to represent different meanings. Connecting the entities and finding the relationships between them requires understanding the concept of the project fully, along with logical/analytical thinking.

In order to design a diagram Entities, Relationships and Attributes need to be highlighted.

**Entity** could be independent thing, place or object that exists and represents the real world.

**Relationship** is a connection that exists between tables and in the diagram to retrieve data or to highlight the way the A side is linked to the B side (entities).

**Attributes** are the characteristics that refer to the tables of a database.

## **RELATIONAL DATA MODEL**

Designing the relational data model of a database means creating tables of similar data that makes the relation between the entities clear. In other words, a data model represents a database with a certain amount of pre-defined relations while collecting them and putting them together in a table.

There are rules that apply while creating the tables which were also followed in the process of the current project.

* Rows = Tuples (Rows represent Tuples)
* Column headings = Attributes (Columns of the table represent Attributes)
* Table = Relations (Tables represent Relations)
* Domain = Value (Domains represent the values or the data of same type )

The data model also consists of restrictions also known as constraints

* Implicit constraints are directly applied in the schemas of the data model
* Explicit constraints that can't be immediately applied to the data model's schemas.
* Semantic constraints that apply business-based restrictions
* Domain constraints that restrict the application of any value but atomic
* Key constraints that allow a single or many tables to have a unique property stored. For example, primary keys.

1. A primary key cannot be NULL, that means if a key is NOT NULL on 1 table, then it must be NOT NULL on all the tables its used.
2. Same rules apply on foreign keys, but they need to be highlighted and taken from a tuple and referenced as to where it came from and where its being used.

Restrictions and rules were considered & applied on the BBK project, and the data model is proof of that.

## **MAPPING/NORMALISATION**

Normalisation of schema is mapping out the approach in connecting the entities and the attributes while applying necessary rules and steps. For a database to work properly, after creating the data model those rules and steps need to be considered and checked. If the diagram and the model are accurate depending on what the purpose of the project is, then the normalising of the database is basically done.

The steps followed for BBK are

1. **Mapping the Entities of a schema**

* Highlighting the entities and choosing / underlining one or more primary keys for each entity

1. **Choosing a weak entity**

* Choose an entity that could possibly only exist when owned from a different entity(possible normal entity)

1. **Mapping of Binary 1:1 Relationship Types in ERD**

* Foreign key

As mentioned before, a key that connects 2 tables or 2 Entities and control the data of it.

* The relationship relation approach

Establishing an effective a way of structuring information in tables, rows, and columns

1. **Mapping of Binary 1:1 Relationship approach**

* Making sure either the Foreign Key or the relationship approach is used.

1. **Mapping of M:N Binary approach**

* Making sure the relationship approach is applied

1. **Mapping a Multivalued Attribute**

* Creating relation for the multivalued attribute and providing a primary key for it which will represent the normal entity.

1. **Mapping of N-ary Relationship Types**

* Mapping the nested binary with the new binary relationships and adding foreign keys to them.

Making sure all the above steps were considered, marks the completion of an effective normalisation and designing of a database.

## **BIBLIOGRAPHY**

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