## Studio 1 – Design and Build Instructions

|  |  |
| --- | --- |
| Instructions Issued | Week 5 |
| System is due | Minimum Viable Product - **Week 6**.  Final System - **Week 8** |
| Competency Based Mark | Meets Requirements / Does Not Meet Requirements |

## Learning Outcomes Covered

* Communicate appropriately in informal and semi-formal written and verbal contexts.
* Discern functional and non-functional aspects within a problem domain in the context of data modelling.

## General

You will build an Information System in a Problem Domain of personal interest to you. You will implement this System using **SQLite** and create **Queries** to implement **various Use Cases** that you have previously identified in your written proposal.

The documentation for this assignment comprises of:

* + This word document.
  + A separate spreadsheet containing the marking rubric.

**If you do not understand anything about this assignment you must see me.**

It is expected that the subject of this assignment will be related to your Proposal Document that you submitted in Week 2. **If you wish to change from your original choice, you must obtain approval from me, and be prepared to submit a new proposal document.**

This assignment is a **substantial item of work** that builds on things you have learned with me, and in your other papers. **It showcases you!** It demonstrates your technical knowledge and your ability to think logically about a problem.

## Due Dates – Week 6 and Week 8

In order to explain the two due dates for this task, it might help to give an example of the timeline you need to follow:

|  |  |
| --- | --- |
| **Week 5** | Create and finalise ERD. Begin Build! |
| **Week 6** | Build Database. Start Data Dictionary. **Core design settled. Simplest queries implemented.** **First review of your system by your lecturers!** |
| **Week 7** | Last DB workshop. Prep for PDR. |
| **Week 8** | PDR meetings all week. **Final evaluation of your system**. |

Although you have 3 weeks to complete your task, the time we have to review what you building in class is minimal. Please make sure that **your design ideas are locked in by week 6.**

## Task1: Construct a Written Blueprint.

You are to blueprint your system. You are to use the **report template** as found on Moodle. **Your report will have the following sections/Headings**:

1. **Data Dictionary**
2. **Design Analysis and Use Cases**
3. **Entity Relationship Diagram**

**1 - The Data Dictionary**

Table 1 - Example of Data Dictionary item for a single Entity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| Purchase | Customer purchases of Items. This table is an associative entity that implements a many-to-many relationship between CUSTOMERS and INVENTORY | | | | |
| Field Name | Description | Datatype | Key Field? | Constraints | Example |
| Purchase ID | Unique ID for each purchase | Autonumber | PK | Unique, not null | 001 |
| Customer ID | From CUSTOMERS table | number | FK | Not null | 10 |
| ItemID | From INVENTORY table | number | FK | Not null | 20 |

* Create a data dictionary for your database.
* Identify **all entities**.
* Identify **all attributes**. Full description for each attribute as per **Table 1 above.**
* Show appropriate **SQLite data-types** for each attribute.
* Identify **all candidate relationships**.

**2 - Analysis of Design Process and Use Cases – Between 500 to 1000 words**

You must **describe your design process**. You are expected to describe:

* Your **initial analysis of the Problem Domain**. What things became entities. How you defined the boundaries of the problem domain to control the scope of your project.
* What **Use-cases** you wanted to implement. Provide a bullet-point list.
* The process of building your system. Explain what entities or attributes you removed; what necessary ones you added (referring back to your original system proposal). **Why.**
* If your Design and Build assignment is substantially different from Proposal, you must include an explanation **in detail** why your delivered product differs from your promised.
* Anything else that logically supports and justifies the design you have created.

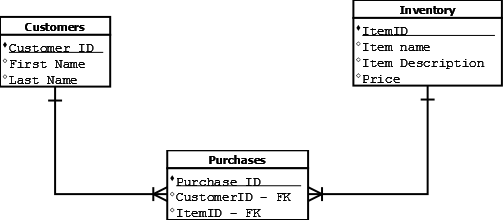
**3 - An ERD**

**Using modelling software of your choosing**, draw an Entity Relationship Diagram of the **Physical Model of your system**. (i.e.: you will map out many-to-many relationships, showing the joining table between.)

Your diagram must:

* Use **Crowsfoot notation**
* Be **legible** and **well organised**.
* Show **all relevant entities**, attributes and relationships.
* Show **correct cardinality** between entities.

Table 2 - Example of an ERD listing attributes for each entity



**Create a professional document**

Combine all of the above into a single document. Include a brief summary of your system written in plain English as your Executive Summary. The document should be of a **professional standard** so include a title page, be well structured and grammatically correct.

## Task 2: Construct a Relational Database in SQLite.

**Using SQLite**, construct all tables and relationships for the information system.

The tables should

* Be relevant, necessary to the problem and **conform to the ERD**.
* Have **suitable relationships** with other tables which enforce referential integrity. (Use of the PRAGMA foreign\_keys statement)
* Have suitable **primary** and **foreign keys**.
* Be populated with sensible data.
* Have sensible names.

The table fields should

* Be appropriate to the problem and conform to the ERD.
* Have sensible names.
* Be documented.
* Have suitable properties.

**The system scope should fully cover the Problem Domain as agreed between you and your Lecturer. It will not be signed off until it does.**

I will run your code by coping and pasting to the SQLite3.exe command prompt

You will save the SQL commands you use to build and populate your database in a separate file called “***yourname*\_build.sqlite**”

## Task 3: Implement Use Cases as queries in SQLite.

You will construct queries for your information system. I will be comparing the use cases you have identified in your proposal and data dictionary, to the queries that you create. (There should be an approximate correspondence, or an increase, **not** **a decrease**.)

You also need to create sufficient queries to demonstrate the following technical skills:

1. You can make queries on **single tables**, using **selected fields**.
2. You can implement criteria on most of your queries (WHERE)
3. You can make queries on **two joined tables** (INNER JOIN, LEFT JOIN)
4. The use of aliases on field names in query output.
5. You can make queries on **more than two** joined tables (INNER JOIN only)
6. You can demonstrate **sorting** (ORDER BY).
7. You can apply **grouping** and **aggregate functions**
8. You can create **new calculated fields in query output.**

**If** you have use cases that are beyond your current technical capabilities to complete (Or can’t be done purely in SQL):

1. Create the query that would produce the basic data needed.
2. Explain in a code comment the “algorithmic steps” you would need to process your query output to fulfil you use case

Each query should

* Be relevant to the needs of the user (Use Cases).
* Be user-friendly in layout.
* Operate correctly in terms of information creation and presentation.

**There should be enough queries to fulfil all the use cases as defined in your proposal and to demonstrate the technical requirements as specified**

You will save the SQL commands you use to query your database in a separate file called “***yourname*\_queries.sqlite**”

## Deliverables

You will upload **THREE FILES** to your repo:

**One ASCII plain text file called “*yourname*\_build.sqlite”**

* Linked tables as per your ERD □
* Data inserted to create viable queries □

**One ASCII plain text file called “*yourname*\_queries.sqlite”**

* Queries cover all **technical requirements** □
* Queries to cover all defined **Use Cases** □

**One file, MS Word or PDF - Data Dictionary**

* Fully Defined Data Dictionary for all Entities □
* Analysis of the design and build of your system

Use cases identified and listed □

Analysis of the design and build process □

* Entity Relationship diagram using Crows-foot notation □

Done using modelling software □

**Three files in total uploaded to Moodle.**