

## Project part 2

Deadline: Monday 13 May 2024, 1800 hrs.

**This assignment involves two electronic submissions** (PDF and .txt) followed by a demonstration

### 1 General Specification

**(a)** An Entity-Relationship Diagram is made available to you. Use that diagram to create a logical model representation. You are required to Identify a primary key for each relation and as well as all foreign keys in the model.

You are required to use the database description language. Please refer to the lecture as well as chapter 17 of the reference book. A sample relation is as follows (taken from the referenced dreamhome case study in the reference book):

```
Client (clientNo, fName, lName, telNo, prefType, maxRent, staffNo)
Primary Key clientNo
Foreign Key staffNo references Staff(staffNo) ON UPDATE CASCADE ON DELETE NO ACTION
```

Please **justify** the reasoning behind the derivation (e.g. why does it contain a foreign key, can the foreign key be NULL, why has a particular ON UPDATE been chosen, etc.), for example:

Client is a strong entity. The simple attributes fName and lName listed which were part of the composite attribute name. prefType has been merged into the Client entity from the Preference entity. There was a 1:1 relationship between Client and prefType which means there was mandatory participation on both sides. staffNo has been posted as a foreign key into the Client relation from a 1:\* Registers relationship where Client was the child and Staff was the parent. staffNo is NOT NULL as Client has mandatory participation in the Registers relationship. UPDATE CASCADE was chosen to update staffNo whenever the attribute changes in the Staff table. DELETE NO ACTION has been selected to stop Staff being deleted without first updating Client.

**(b)** Translate your answer to (a) into SQL (in a file .txt) and build the database using capabilities of SQLite. Include the relevant DROP statements and specify ALL primary and foreign keys. If want to demonstrate ISO SQL that is not available in SQLite then include as a comment, but ensure that you have correct, runnable SQLite database as well. You also need to populate your database (INSERT INTO ...) with some sample data and perform some simple queries to ensure it works correctly.

**In the same file, for the following questions create views with the given names:**

1. List the patient name, customer responsible for paying fee, amount of pending fee and contact details. [view name: pendingFee]

2. List the patient name, doctor's last name, any one of doctor's qualifications for patients that had an appointment in the month of January [view name: stats]
3. List the current service fee for all the services when it is greater than \$100. [view name: expensiveServices]

**Note: You are allowed to use any operations and functionalities provided in sqlite3 to do your implementation including, subqueries, joins and triggers.**

## 2 Submissions

The submission of any work will be taken as your claim that it is your own work (or that of you and your partner if working in pairs), i.e. that you cognitively and physically created it. Use of AI tools for instance ChatGPT is not allowed. Please check UWA's website for policies related to academic misconduct.

This also indicates that you can re-create and/or explain your work during the face-to-face demonstration.

The required submission for Part 2 of the project includes:

1. A PDF containing the description of the derived relations <sup>view</sup> **and** your reasoning behind the derivation of the relation.
2. An SQLite script (.txt) file that can be executed on SQLite. You will be penalised heavily if the file does not execute without errors.
3. You may also submit an assumption and clarification document to assist in interpreting your derivations and implementation.

## 3 Assessment

For students working in group, each member will receive similar marks. If you have issues with your group member, please let me (UC) know as soon as possible. Also, you do not have to continue the groups from part 1 of the project. You are allowed to change your groups.

The assignment will be marked out of 60. A guide to the breakdown of the marks over the parts is provided as follows. **Please note, I will share a more detailed rubric toward the end of this week.**

(a) 40 marks

(b) 20 marks

**Inconsistencies between the relations document and your code make you lose marks.**

## 4 Specifications

**PLEASE base the design on the description.** We have discussed requirements gathering from the enterprise during several lectures. You need to adhere to the specifications provided. If something is not clear, please first post it on forums (so that other students can also benefit), before sending us an email at [cits1402-sem1-pmc@uwa.edu.au](mailto:cits1402-sem1-pmc@uwa.edu.au).

In the case-study description the following notation is used to indicate the type of data items:

(N x) a digit string (integer) of length x

(S x) a character string of length x

(\$ x) x dollar digits and 2 cent digits

(C) a combination of

family name (S 20)

personal name (S 20)

title (S 4)

(A) a combination of

street address (S 45)

postcode (S 4)

(D) time and date or either

## Case Study

The Sharp Vision Eye Clinic needs a management system to coordinate appointment scheduling and handle patient billing within its large-scale surgical facility.

Each treatment room in the clinic has a unique number (N 3). Similarly, each eye-surgeon has a unique identifier code (S 2) recorded along with their name (C), contact phone number (S 14) and one to three qualifications (each S 10). *Each eye surgeon has one or two surgery rooms in which they work.* Please note that more than one surgeon can use the same room at different times. However, a surgeon will only use one room at a time. *Each surgeon has a preferred room as well.*

Each patient or customer is uniquely identified by a client number (N 8) which is assigned to them when they first become associated with the clinic and is used for them thereafter. Also recorded are their name (C), address (A) and one to three contact phone numbers (S 14). A customer is responsible for paying the bills for one or more patients, which may include their own bill or their family members' bill. For instance, a parent might be a customer without being a patient if they pay the bills for their child who is a patient.

For each actual patient, their Date of Birth (D) and their Medicare number (S 12) are also recorded, along with which customer is currently responsible for paying for their treatment.

There are various services available in the clinic. For each service available, the prescribed code (S 4) is recorded along with a description (S 20) and the current service fee (\$ 3). Also identified are those surgeons who give this service. Most surgeons give a large number of services but not all of them.

When a patient requires some treatment, one or more appointments are scheduled; each appointment is for a particular date and starting time (D) with a specific surgeon. Appointments are made in hour blocks; on the hour. (At any one time there is only one appointment for a particular *surgery-room* and a particular surgeon.) The patient is allowed to schedule appointments with different surgeons on the same day if needed. *A patient does not have to be seen by the same doctor across different appointments but each appointment is with a single doctor..*

*Doctors can vary the standard fee and fees may change. We need to store the actual fee of a service given in an appointment. We can make this an attribute of the relationship between service and appointment.* At the end of an appointment, an invoice is generated. This invoice also serves as an entry in the patients' treatment history. Each invoice also has a unique invoice number (N 5), it identifies the patient and the surgeon involved, as well as the customer billed. It records the relevant date (D), a clinical comment (S 200) if one is provided and the total fee (\$ 4). The invoice initially has a status (S 1) of 'C' ("completed"). At some later stage, the status is changed to 'B' ("bill sent") and eventually, the status is changed to 'P' ("paid"). Each of the invoice's include one to five lines that identify the services given during the appointment.

**Note: Requirements in italics (in purple) are new requirements that the customer wants in this database. The supplied ER diagram takes care of these requirements.**

## 4.2 Operations and Questions

The “Operations and Questions” are here to help verify/validate your design. You do not need to provide answers to questions for the assignment.

- Add a new appointment
- Who has booked the most appointments?
- Find the doctor who gives the service X
- Which service is the most/least popular?
- Which doctor is used the most?
- Which treatment is used the most?
- Which doctor has the smallest number of patients?
- Which service has made the clinic the most money?
- Which clients have not paid and what is the outstanding amount and the contact details?
- Which doctor has the most services offered?
- What service is required for appointment X?