Project Database Design CITS1402
Happy Holidays

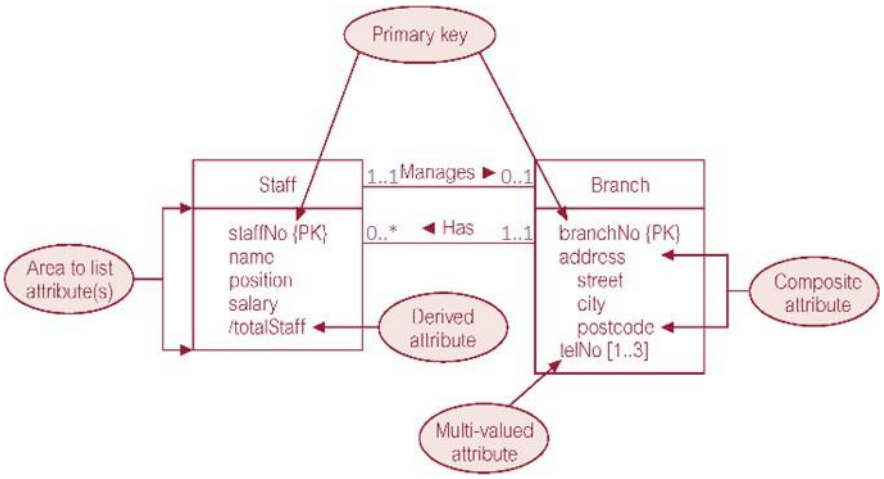
General Specification

(a) Construct the information model (templates are provided)

1. List all entities on the **Entity Data Dictionary** worksheet. Record the name, a description and any aliases. In the Occurrence column describes how the entity exists in the organisation. List any dependent entities and indicate in the occurrence which entity it depends on.
2. List all relationships on the **Relationship Data Dictionary** worksheet. Record the name, a description and any aliases. In the Occurrence column describes how the relationship exists in the organisation.
3. List all relationships and entities on the **Relationship-Entity Data Dictionary** worksheet. For each participating entity, give the multiplicity (participation and cardinality). If the relationship is greater than binary, then list other entities on subsequent rows
4. For each identified entity and relationship list their attributes on the **Attributes Data Dictionary** worksheet. For all attributes, give a description, an indication of the data type and length, whether it can be NULL (i.e. optional), and if it can be multi-valued.

(b) Using your answer to (a) draw up and Entity-Relationship Diagram (ERD). The diagram can be hand drawn. It should be at least A4 size which is also the recommended size of the page. The important criteria are consistency with part (a), clarity and readability.

Entities in the ERD should fully represent the information contained in the data dictionary. That is, include all the attributes and any other necessary information. It should also conform to the Unified Modelling Language specification discussed in lectures and the reference book. An example of entities is shown here:



(c) 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.

(d) 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. While doing so I encourage you to try simple and complex queries and also practice the use of Views and Triggers

4. Specifications

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

4.1 General details.

The description may not represent a real-life scenario. However, it is simple enough to help you apply the concepts that you have learnt in the class and may still have a real world flavour (and gives students insight into the real world use of databases). Description is as precise as possible. Any solution that could be reasonably derived from the description will be accepted.

Ensure the **design strictly follows the provided specifications**, as they are essential requirements. Deviating from the specifications is considered unprofessional. If there are concerns about the validity of the description, it is important to promptly discuss them with me. I am open to clarifying any parts of the description that may seem unclear. Also, make sure to frequently check LMS for any updates or additional details

Case Study

The car hire firm Happy-Holidays, requires a database system to manage their fleet of hire vehicles. Each vehicle in the fleet has a unique fleet membership number (N 3). Also recorded is the vehicle's registration number (S 7), colour (S 20), and make (S 8). All cars are the current model. If a car is fitted with a mobile phone, its phone number (S 12) is recorded.

Happy-Holidays has multiple depots. Each depot has an identification code (N 2). The following information for each depot is also recorded: depot's address (A), 1 to 4 phone numbers (S 14), and an email address(S 24). The current location (depot) of vehicles available for hire is recorded.

The firm has several different types of daily hire tariffs. For each type, an identification code (S 2) is recorded only with a description of the conditions under which it applies (S 50). For each make of car, the daily rental tariff ($ 3) is recorded for each of the tariff types. Also daily insurance tariff ($ 3) is recorded.

When a vehicle is hired, the depot from which it is hired, and the hire time and date (D) are recorded. The hirer (client) involved is recorded along with the type (S 2) and number (S 20) of the credit card to be used to pay for that hire. There will be one or up to three persons recorded as being nominated drivers of the hired vehicle (None of these have to be the hirer). A vehicle's odometer reading (N 5) (distance travelled) is recorded when it is hired. At any one time, only one vehicle is on hire to a customer. Also recorded is the applicable tariff type, the number of hire days (N 2) and an indication (S 1) as to whether insurance has been taken out for each hire.

A make of vehicle may also be booked for a future hiring, in which case, the nominated pick-up depot, the starting time and date for the booking (D), and the intended number of hire days (N2) are recorded. An optional preferred colour (S 12) may be recorded. A client may make any number of bookings. A vehicle can be one of the following types: EV, Hybrid, Fuel.

The firm records the individual details of any client the first time that the person or the company[1] has business with the company. A client's name (C), address (A), one or two contact phone numbers (S 14), and one or two email address (S 20) are recorded along with a generated unique client identifier. This identifier is used for all subsequent references to that client. If the client is a company, they must have a (single) nominated person also recorded as their representative. The details of such representatives are recorded as though they were person clients. A (person) client's driver's license number (S 12) is recorded the first time that they hire a vehicle or are a nominated driver.

Scope creep:

The customer loves the design and has some more ideas to include known as “scope creep”

- *Drivers have the same information stored as if they were clients*
- *Multiple drivers for a single hire*
- *The Insurance Policy Types should also have the individual Insurance Policy Number that its generated and given to the Client.*
- *Only after the vehicle is returned an invoice is generated for the vehicle hired (with a unique invoice ID (N 10) that contains the details or the hirer (and company if applicable), the vehicle hired, the return depot, an indication that the vehicle passed a quality check (a ‘Yes’ or ‘No’) and the final cost ($ 5) based on the number of days and the daily rental tariff. The date paid (D) is also recorded and if it has not been recorded the invoice is considered unpaid.*