Entity-Relationship Activities

For each of the scripts below, create an Entity-Relationship diagram and normalise the tables.

1. Dave the D.J. asks you to create a database that stores the details of his records, tapes and CDs. In relation to the various music items he needs the database to store:

    - the name of the album
    - the artist
    - the cost
    - the type of media (record/tape/CD)
    - the recording company
    - the individual tracks - name and order on album
    - the length of each track
    - the songwriter of each track

2. Denise the Software Developer is looking to create a database for storing Contact details. She has contacts who supply her with software, equipment, peripherals etc, other contacts for whom she develops software, and others who she considers professional peers. Denise needs to store:

    - Surname, Given Name
    - Type Of Contact
    - Organisation
    - Number in Organisation
    - Type of Business
    - Nature of Business
    - Street, Suburb, Postcode
    - Phone, Fax, Mobile, Email
    - Date first met
    - Notes

    (a) Denise initially decides to build a single-table database.
    (b) After entering 5 or 10 contacts, Denise realises that her data entry would be quicker if she added a number of lookup lists (such as suburbs, Type of Contact, etc)
    (c) After some further data entry Denise begins to realise that many contacts have multiple 'Types of Contact'. For instance some contacts are both supplier and customers.

3. Simon the Chef asks you to create a database for storing collections of recipes. Simon would like the recipes to be categorised by various types such as meat dishes, entrees, desserts etc. Simon would also like to categorise the recipes by meal time - breakfast lunch, dinner etc. Simon would also like to identify vegetarian meals. Each recipe would have a title, a brief description, a photo, a procedure for creation, and a list of ingredients with quantities.

4. Vanessa the Veterinary Surgeon is looking for a database to record visits by her various animal patients. She is wishing to record the animals name, description, type of animal, breed, the owners name, address and phone details, as well as the details of each visit.

   (a) Vanessa realises that each patient may visit many times.
   (b) After Vanessa had used the database for a time, she asks that the database record the various medications used during each visit, and prescribed after each visit. She wants to record the name of the medication, description, supplier, cost, the quantity administered/provided, and whether it was administered during the visit, or prescribed after the visit. (There is a finite list of medications that Vanessa uses in her surgery).

5. Cathy the Computer Shop Owner is after a simple customer orders database. She indicates that she needs to record:

   - Client details - name, address and phone numbers.
   - Product details - name, description, cost and retail prices, stock on hand
   - Order details - date of order, date of delivery, customer details, products, the quantities ordered, retail price, subtotal, sales tax and order total.

   (a) Cathy knows that Orders have Order Lines.
   (b) After some period of use, Cathy wishes to extend the database to include her orders to suppliers. She wants to record Supplier details and Supplier Order details.
   (c) Cathy begins to offer a periodic payment service to her clients - for a given order, a client can make many payments.

6. Carla runs a Computing Consultancy, advising her clients on hardware and software purchases, as well as a broad range of other computing issues. Carla has a team of young consultants who assist families and individuals with computing purchases and the setting up of PC's and small networks within homes and small offices. Each visit is known as a 'Service'.

   (a) Carla requires a database to log clients, employees, services, service lines and payments. One employee and one payment are to be linked against each service.

   (b) Carla finds that she needs to store and retrieve details relating to various client PC, network and software concerns - a knowledge base. This knowledge base would store the details of each concern and the solutions or follow-up. Against each concern would be stored a list of search strings. (This component of the database does not need to be linked to the client jobs).

   (c) After a period of use Carla decides that she needs to link multiple payments to each service. She also wishes to link services to items in the knowledge base - she considers that each service can have multiple entries in the knowledge base, and each knowledge base entry could be linked to multiple services.

7. Gary lives in a 'Group' House and requests a database to store details of:

Residents: their names, mobile phone number, email address, details of family contacts (in case of emergency) and vehicle details. At least one resident has two cars, and several members have more than one set of family contact details.

Bills Paid: a log of shared bills, such as food, phone, and electricity. Gary wants to be able to select the type of bills from a lookup list.

Phone Log: a log of the outgoing International phone calls, with the ability to record the person calling, time of call, duration and distance of call.

Groceries: a list of the common shared grocery items, the quantities commonly purchased, and their standard costs.

Shopping Excursions: the date and location of individual shopping excursions and the list of what was purchased, with quantity and expenditure details.

Jobs: a list of the shared household chores, linked to the members responsible for each. The various chores need to be selectable from a lookup list.

8. Natalie owns a thriving Nursery. She requires a database to track her sales (invoices and products), and her purchases (suppliers, supplier invoices and raw materials). Natalie also wishes to track (or link) the raw materials she uses to create her various plant products.

(NOTE: Natalie does NOT wish to track customers)

9. Adam the Administrative Officer is responsible for receiving and returning assignments from and to students. The students hand in assignments at the counter, and request the return of marked work. Adam requests a database that will track:

- Student Details - names, addresses and phone numbers
- Teacher Details - names, faculty, staff room and phone numbers
- CSU (subject) Details - CSU code, title, description, and hours of study.
- Assignment Submission Details - assignment name, assignment description, teacher, CSU, student submitting, date submitted, date sent for marking, date returned from marking, date returned to student, final result.

(a) Adam suggests that the assignment details could be entered by the teachers, while he would be responsible for entering the submissions by students. There can be more than one assignment per CSU.

(b) After using the database for a short time, Adam realises that one assignment can be handed in by a group of students. He would like to record all students in such a group against the assignment submission record.

(c) Some time later, it becomes apparent that one assignment can be set for more than one CSU. That is: one assignment could be set for a clump of CSU's. Adam requests that the database accommodate this possibility.

(d) Adam asks if it would be possible for the database to track students who are enrolled in the various CSUs.