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# Project "Pawsome Pets" – Part 2

a) Derive relations from the conceptual model.

| Entity 1 | Multiplicity | Relationship | Multiplicity | Entity 2 | Type |
|---|---|---|---|---|---|
| Clinic | 1..1 | Employs | 1..* | Staff | 1..* |
| Staff | 1..1 | Manages | 1..1 | Clinic | 1..1 |
| Clinic | 1..1 | Registers | 0..* | Pet | 1..* |
| PetOwner | 1..1 | Owns | 1..* | Pet | 1..* |
| Staff | 1..1 | Performs | 0..* | Examination | 1..* |
| Pet | 1..1 | Undergoes | 1..* | Examination | 1..* |

b) Validate the logical model using normalization to 3NF.

**Clinic**(clinicNo, cName, cPhone, cAddress)
The table is flat (1NF), has no partial dependencies (2NF), and no transitive dependencies (3NF)

**Staff**(staffNo, sNameFirst, sNameLast, sPhone, sAddress, DOB, position, salary)
We can turn the sName variable into sNameFirst and sNameLast to flatten the table. There are no partial dependencies (2NF), and no transitive dependencies (3NF)

**Pet**(petNo, pName, DOB, species, breed, color)
The table is flat (1NF), has no partial dependencies (2NF), and no transitive dependencies (3NF)

**Examination**(examNo, chiefComplaint, description, dateSeen, actionsTaken)
The table is flat (1NF), has no partial dependencies (2NF), and no transitive dependencies (3NF)

**Owner**(ownerNo, oNameFirst, oNameLast, oPhone, oAddress)
We can turn the oName variable into oNameFirst and oNameLast to flatten the table. There are no partial dependencies (2NF), and no transitive dependencies (3NF)

c) Validate the logical model against 5 user transactions. (Note: These will be then implemented in 3c).
   a. Show the records of all examinations performed on pets owned by James T. Kirk
   b. Show the list of all staff who manage clinics, the name of the clinic they manage, and their salary
   c. Show the list of all Poodles examined by staff member Hannah Hall

d. List all pet owners who have a pet registered with Pawsome Pets clinics in San Antonio, TX
e. Show all pets registered at UMiami pet clinic

d) Define integrity constraints:
   a. Primary key constraints.

      Staff: staffNo <PK>
      Clinic: clinicNo <PK>
      Examination: examNo <PK>
      Pet: petNo <PK>
      Owner: ownerNo <PK>

   b. integrity/Foreign key constraints.

      Staff:
      FOREIGN KEY clinicNo REFERENCES Clinic(clinicNo) ***employs

      Clinic:
      FOREIGN KEY managerNo REFERENCES Staff(staffNo) ***manages

      Examination:
      FOREIGN KEY staffNo REFERENCES Staff(staffNo) ***performs
      FOREIGN KEY petNo REFERENCES Pet(petNo) ***undergoes

      Pet:
      FOREIGN KEY clinicNo REFERENCES Clinic(clinicNo) ***registers
      FOREIGN KEY ownerNo REFERENCES Owner(ownerNo) ***owns

   c. Alternate key constraints (if any).
      None
   d. Required data.
   e. domain constraints.

| Entity/ Relationship | Attribute | Description | Data type | length | Multi-value | Null? |
|---|---|---|---|---|---|---|
| Staff | staffNo | Unique staff ID | Integer | 11 | No | No |
| | sNameFirst | Staff first name | Varchar | 32 | No | No |
| | sNameLast | Staff last name | Varchar | 32 | No | No |
| | sAddress | Staff home address | Varchar | 32 | No | No |
| | sPhone | Staff phone number | Integer | 10 | No | No |
| | DOB | Staff date of birth | Date | 1 | No | No |

| | | | | | | |
|---|---|---|---|---|---|---|
| | position | Staff position in company | Varchar | 32 | No | No |
| | salary | Staff salary | Integer | 7 | No | No |
| Clinic | clinicNo | Unique clinic ID | Integer | 11 | No | No |
| | cName | Clinic name | Varchar | 32 | No | No |
| | cAddress | Clinic street address | Varchar | 32 | No | No |
| | cPhone | Clinic phone number | Integer | 10 | No | No |
| Owner | ownerNo | Unique owner ID | Integer | 11 | No | No |
| | oNameFirst | Owner first name | Varchar | 32 | No | No |
| | oNameLast | Owner Last name | Varchar | 32 | No | No |
| | oAddress | Owner street address | Varchar | 32 | No | No |
| | oPhone | Owner phone number | Integer | 10 | No | No |
| Pet | petNo | Unique pet ID | Integer | 11 | No | No |
| | pName | Pet name | Varchar | 32 | No | No |
| | DOB | Pet date of birth | Date | 1 | No | No |
| | species | Pet Genus,species | Varchar | 32 | No | No |
| | breed | Pet breed/variety | Varchar | 32 | No | Yes |
| | color | Pet color | Varchar | 32 | No | No |
| Examination | examNo | Unique examination ID | Integer | 11 | No | No |
| | chiefComplaint | Main cause for visit | Varchar | 256 | No | No |
| | description | What was done in exam | Varchar | 256 | No | No |
| | dateSeen | Date of exam | Date | 1 | No | No |
| | actionsTaken | Result of exam | Varchar | 256 | No | No |

f. General constraints (if any).
No pet can be registered at more than one clinic.
No clinic can be managed by more than one staff.
No examination can be performed by more than one staff.
No examination can be performed on more than one pet.
No pet can have more than one registered owner.

e) Generate the E-R diagram for the logical level (contains FKs as attributes).