

Natalie Gutierrez and Anna Valente

Professor Aguiar

CSC 423

5 November 2024

Project Part 1

1. Develop a conceptual data model reflecting the following requirements:

a. Identify the main entity types.

The main entity types are as follows:

- Clinic
- Pet owner (denoted as PetOwner)
- Pet
- Staff member (denoted as Staff)
- Pet examination (denoted as Examination)

b. Identify the main relationship types between the entity types identified in "a".

1. There are two relationships between Clinic and Staff.

- a. The first one, using the verb “has”, is a one-to-many relationship: a clinic has many staff members, but a staff member can belong only to one clinic. We assume that a clinic has at least one staff member.
- b. The second one, using the verb “manages”, is a one-to-one relationship: Each clinic is managed by one staff member, and a staff member can manage either zero or at most one clinic.

2. A pet owner can own one or more pets, but a pet can only have one owner. The relationship between PetOwner and Pet is one-to-many. We assume that only one main pet owner is put into the database for simplicity.

3. A pet can only register to one clinic, but a clinic can have one or many pets. The relationship between Pet and Clinic is one-to-many. We assume that a clinic has at least one pet as it is what keeps it in business.

4. A pet can undergo zero or multiple examinations, but each individual examination can only belong to one pet. The relationship between Pet and Examination is one-to-many.

We assume that a pet can be registered in the database of the clinic (making their first appointment, etc.) before having any examinations.

5. A staff member can conduct zero or many examinations, but an examination can be conducted by only one staff member. The relationship between Staff and Examination is one-to-many. We assume that some of the staff are not responsible for conducting examinations, thus why some staff will have conducted 0 examinations.

c. Determine the multiplicity constraints for each relationship identified in "b".

Entity	Multiplicity 1	Relationship	Multiplicity 2	Entity	Type of Relationship
Clinic	1..1	Has	1..*	Staff	1:* One-to-many
Clinic	0..1	Manages	1..1	Staff	1:1 One-to-one
PetOwner	1..1	Owns	1..*	Pet	1:* One-to-many
Pet	1..*	Registered With	1..1	Clinic	1:* One-to-many
Pet	1..1	Undergoes	0..*	Examination	1:* One-to-many
Staff	1..1	Conducts	0..*	Examination	1:* One-to-many

1. Clinic and Staff ("has"):

- Multiplicity: 1..* for Clinic to Staff and 1..1 for Staff to Clinic.
- Explanation: Each clinic must have at least one or many staff members, but each staff member can only work at one clinic.

2. Clinic and Staff ("manages"):

- Multiplicity: 1..1 for Clinic to Staff and 0..1 for Staff to Clinic.
- Explanation: Each clinic is managed by one staff member, but a staff member can manage zero or one clinic only.

3. PetOwner and Pet ("owns"):

- Multiplicity: 1..* for PetOwner to Pet and 1..1 for Pet to PetOwner.
- Explanation: Each pet owner can own one or more pets, but each pet can only have one owner.

4. Pet and Clinic ("registered with"):

- Multiplicity: 1..1 for Pet to Clinic and 1..* for Clinic to Pet.
- Explanation: Each pet is registered with exactly one clinic, while each clinic can have multiple pets registered to it.

5. Pet and Examination ("undergoes"):

- Multiplicity: 1..1 for Examination to Pet and 0..* for Pet to Examination.
- Explanation: Each examination is for a specific pet, while a pet may undergo zero or more examinations.

6. Staff and Examination ("conducts"):

- Multiplicity: 1..1 for Examination to Staff and 0..* for Staff to Examination.
- Explanation: Each examination is conducted by a specific staff member, while a staff member may conduct none, one, or multiple examinations.

d. Identify attributes and associate them with entity or relationship types.

1. Clinic:

- a. Attributes: clinicNo (Primary Key), clinicName, clinicAddress, clinicPhoneNumber

2. Staff:

- a. Attributes: staffNo (Primary Key), staffName, staffAddress, staffDOB, staffPosition, staffSalary

3. PetOwner:

- a. Attributes: ownerNo (Primary Key), ownerName, ownerAddress, ownerPhoneNumber

4. Pet:

- a. Attributes: petNo (Primary Key), petName, petDOB, animalSpecies, petBreed, petColor

5. Examination:

- a. Attributes: examNo (Primary Key), complaint, description, dateSeen, actionsTaken

e. Determine candidate and primary key attributes for each (strong) entity type.

1. Clinic:

- a. Candidate Key: clinicNo
- b. Primary Key: clinicNo

2. Staff:

- a. Candidate Key: staffNo
- b. Primary Key: staffNo

3. PetOwner:

- a. Candidate Key: ownerNo
- b. Primary Key: ownerNo

4. Pet:

- a. Candidate Key: petNo
- b. Primary Key: petNo

5. Examination:

- a. Candidate Key: examNo
- b. Primary Key: examNo

f. Generate the E-R diagram for the conceptual level (no FKs as attributes).

