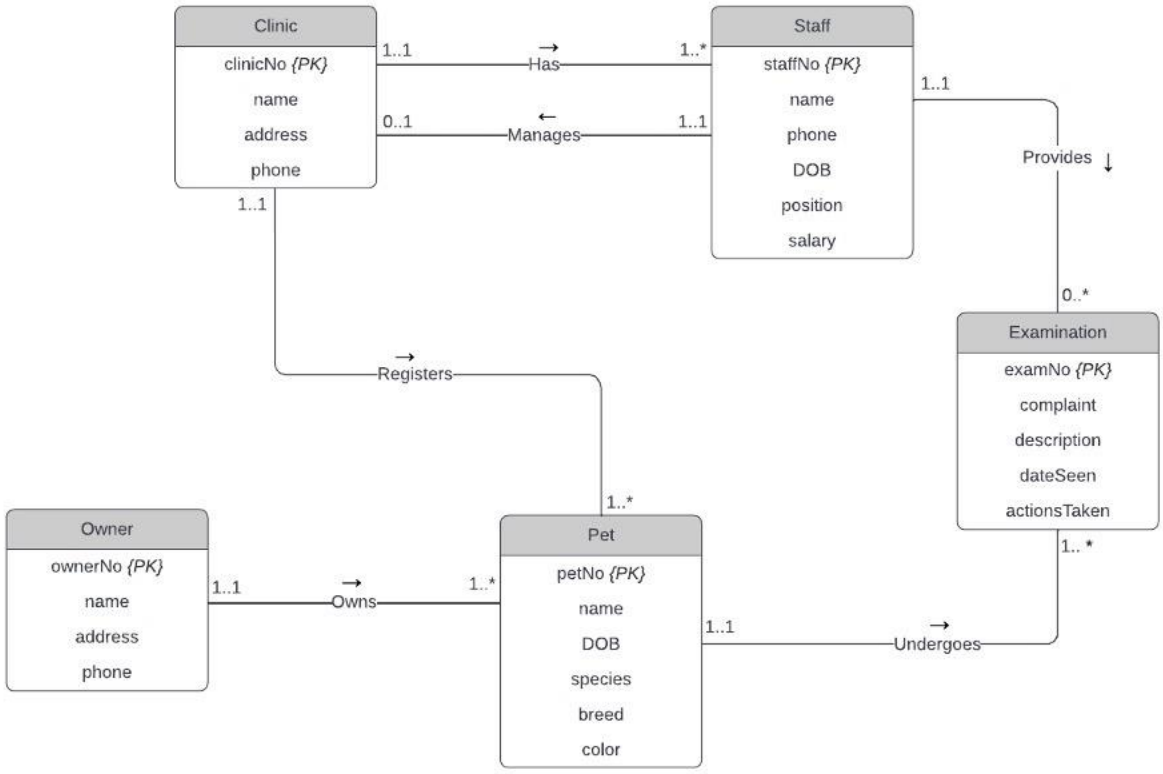
Diep Vu

Project 2



a. Derive relations from the conceptual model

Clinic (clinicNo, name, address, phone, managerStaffNo) **Primary Key** clinicNo **Alternate Key** phone **Foreign Key** managerStaffNo **references** Staff(staffNo)
Staff (staffNo, name, phone, DOB, position, salary) **Primary Key** staffNo **Alternate Key** phone
Examination (examNo, complaint, description, dateSeen, actionsTaken, staffNo, petNo) **Primary Key** examNo **Foreign Key** staffNo **references** Staff(staffNo) **Foreign Key** petNo **references** Pet(petNo)

Owner (ownerNo, name, address, phone) **Primary Key** ownerNo **Alternate Key** phone
Pet (petNo, name, DOB, species, breed, color, ownerNo, clinicNo) **Primary Key** petNo **Foreign Key** ownerNo **references** Owner(ownerNo) **Foreign Key** clinicNo **references** Clinic(clinicNo)

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

The model is already in 3NF since there are no partial or transitive dependencies.

Functional dependencies:

Clinic -> clinicNo, name, address, phone, managerStaffNo

Staff -> staffNo, name, phone, DOB, position, salary

Examination -> examNo, complaint, description, dateSeen, actionsTaken, staffNo, petNo

Owner -> ownerNo, name, address, phone

Pet -> petNo, name, DOB, species, breed, color, ownerNo

c. Validate the logical model against user transactions.

1. List all pets of an owner: You would join the Pet and Owner relations on Pet.ownerNo = Owner.ownerNo
2. List all managers: Join Clinic and Staff on Clinic.managerStaffNo = Staff.staffNo
3. List all examination performed by a staff: Join Examination and Staff on Examination.staffNo = Staff.staffNo
4. List all examination a pet undergoes: Join Pet and Examination on Examination.petNo = Pet.petNo
5. List all pets that are registered at a clinic: Join Pet and Clinic on Pet.clinicNo = Clinic.clinicNo

d. Define integrity constraints

i. Primary key constraints

Clinic: clinicNo – primary key, NOT NULL

Staff: staffNo – primary key, NOT NULL

Owner: ownerNo – primary key, NOT NULL

Pet: petNo – primary key, NOT NULL

Examination: examNo – primary key, NOT NULL

ii. Referential integrity/Foreign key constraints.

Clinic: **Foreign Key** managerStaffNo **references** Staff(staffNo) ON UPDATE CASCADE ON DELETE SET NULL

Examination: **Foreign Key** staffNo **references** Staff(staffNo) ON UPDATE CASCADE ON DELETE SET NULL

Foreign Key petNo **references** Pet(petNo) ON UPDATE CASCADE ON DELETE SET NULL

Pet: **Foreign Key** ownerNo **references** Owner(ownerNo) ON UPDATE CASCADE ON DELETE SET NULL

Foreign Key clinicNo **references** Clinic(clinicNo) ON UPDATE CASCADE ON DELETE SET NULL

iii. Alternate key constraints (if any).

Clinic: **Alternate Key** phone

Staff: **Alternate Key** phone

Owner: **Alternate Key** phone

iv. Required data.

All primary keys are required (NOT NULL)

Clinic: name, phone NOT NULL, mangerStaffNo NOT NULL (Assumption: Every clinic has to have a manager)

Staff: name, phone NOT NULL

Pet: name, breed, species NOT NULL

Owner: name, phone NOT NULL

Examination: description, dateSeen NOT NULL

v. Attribute domain constraints.

Clinic: clinicNo, name, address, managerStaffNo: VARCHAR(50)

phone: INT

Staff: staffNo, name, position, clinicNo: VARCHAR(50)

phone, salary: INT

DOB: DATE

Examination: examNo, complaint, description, actionsTaken, staffNo, petNo: VARCHAR(50)

dateSeen: DATE

Owner: ownerNo, name, address: VARCHAR(50)

phone: INT

Pet: petNo, name, species, breed, color, ownerNo: VARCHAR(50)

DOB: DATE

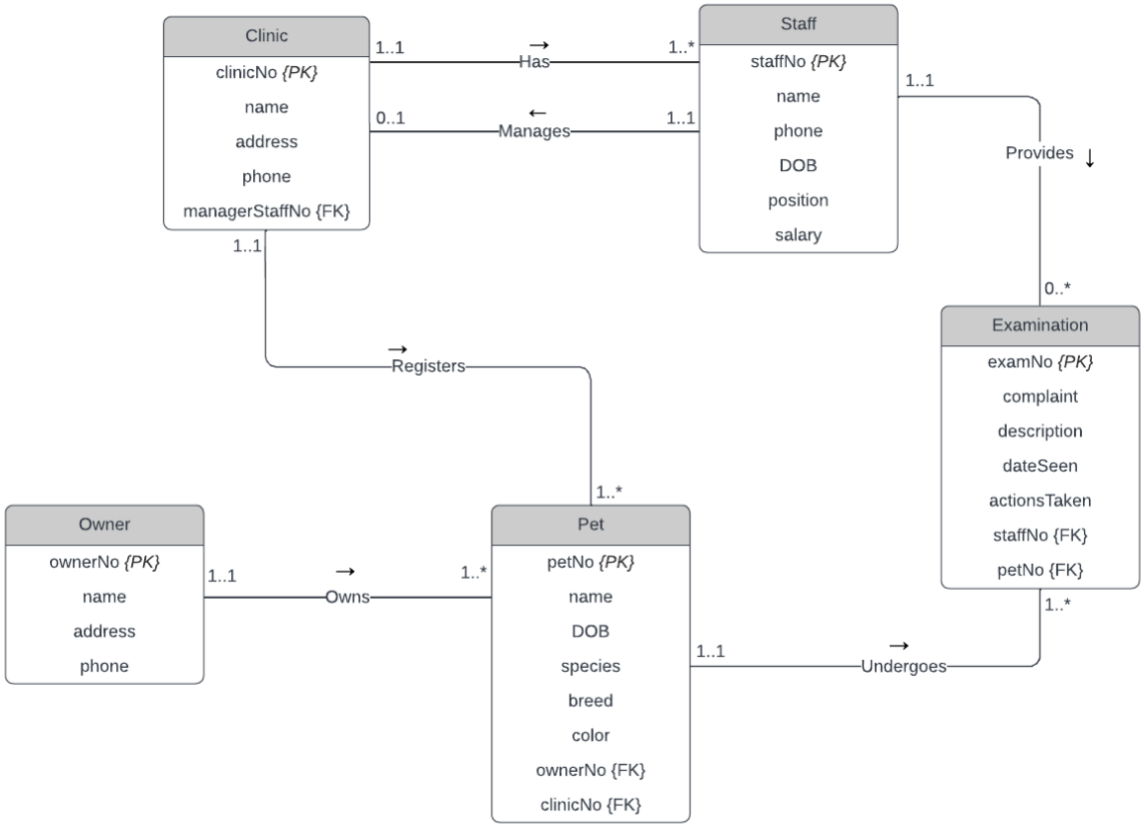
vi. General constraints (if any):

Staff: DOB must be before or on current date

Examination: dateSeen must be before or on current date

Pet: DOB must be before or on current date

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


Clinic
clinicNo {PK}
name
address
phone
managerStaffNo {FK}
Staff
staffNo {PK}
name
phone
DOB
position
salary
Examination
examNo {PK}
complaint
description
dateSeen
actionsTaken
staffNo {FK}
petNo {FK}
Owner
ownerNo {PK}
name
address
phone
Pet
petNo {PK}
name
DOB
species
breed
color
ownerNo {FK}
clinicNo {FK}
1..1
Has
1..*
0..1
Manages
1..1
1..1
Provides
0..*
1..1
Registers
1..*
1..1
Owns
1..*
1..1
Undergoes
1..*