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CSC 423 Project 1 Part 2

1. Develop a logical data model based on the following requirements:

a. Derive relations from the conceptual model.

1. CLINIC (
    - clinicNo (PK)
    - clinicName
    - address
    - phoneNumber
    - managerStaffNo (FK to STAFF, nullable))
2. STAFF (
    - staffNo (PK)
    - firstName
    - lastName
    - address
    - phoneNumber
    - DOB
    - position
    - salary)
3. OWNER (
    - ownerNo (PK)
    - firstName
    - lastName
    - address
    - phoneNumber)
4. PET (
    - petNo (PK)
    - name
    - DOB
    - species
    - breed
    - color
    - ownerNo (FK to OWNER)
    - clinicNo (FK to CLINIC))
5. EXAMINATION (
    - examNo (PK)
    - dateSeen
    - chiefComplaint
    - description
    - actionsTaken
    - petNo (FK to PET)

- staffNo (FK to STAFF))

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

All relations are already in 3NF because:

1. They are in 1NF:
   - All attributes are atomic
   - No repeating groups
   - Primary key identified
2. They are in 2NF:
   - All non-key attributes are fully functionally dependent on the primary key
   - No partial dependencies exist
3. They are in 3NF:
   - No transitive dependencies exist
   - All non-key attributes are directly dependent on the primary key

c. Validate the logical model against 5 user transactions.

Register a new pet with an existing owner and clinic

INSERT INTO PET (petNo, name, DOB, species, breed, color, ownerNo, clinicNo)

VALUES (1, Holley, '2020-05-15', 'Dog', 'Golden Retriever', 'Golden', 101, 10); VALUES (1, 'Buddy', '2020-05-15', 'Dog',

'Golden Retriever', 'Golden', 101, 10);

Schedule an examination for a pet with a staff member

INSERT INTO EXAMINATION (examNo, dateSeen, chiefComplaint, description, actionsTaken, petNo, staffNo)

VALUES (1, '2024-11-24', 'Routine Checkup', 'Annual health checkup for Buddy', 'Vaccination and general examination', 1,

201);

Update clinic manager

Tim Shaw
Yasith Yapa

```
UPDATE CLINIC

SET managerStaffNo = 202

WHERE clinicNo = 10;
```

Retrieve all examinations for a specific pet

```
SELECT *

FROM EXAMINATION

WHERE petNo = 1;
```

Find all pets registered at a specific clinic

```
SELECT *

FROM PET

WHERE clinicNo = 10;
```

d. Define integrity constraints:

i. Primary key constraints.

- CLINIC: clinicNo
- STAFF: staffNo
- OWNER: ownerNo
- PET: petNo
- EXAMINATION: examNo

ii. Referential integrity/Foreign key constraints.

- CLINIC.managerStaffNo references STAFF.staffNo
- PET.ownerNo references OWNER.ownerNo
- PET.clinicNo references CLINIC.clinicNo
- EXAMINATION.petNo references PET.petNo

Tim Shaw
Yasith Yapa

- EXAMINATION.staffNo references STAFF.staffNo

iii. Alternate key constraints (if any).

None identified based on current requirements

iv. Required data.

- All primary keys are required (NOT NULL)
- STAFF: firstName, lastName, position
- PET: name, species
- EXAMINATION: dateSeen, chiefComplaint
- OWNER: firstName, lastName
- CLINIC: clinicName

v. Attribute domain constraints.

- All phone numbers must follow a standard format
- DOB must be a valid date and not in the future
- Salary must be positive
- dateSeen must not be in the future

vi. General constraints (if any).

- A staff member can manage at most one clinic
- A pet can only be registered at one clinic
- Examination date must be after pet's DOB

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

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