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CSC423
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CSC423 Project Part 3

a.) Develop SQL code to create the entire database schema, reflecting the constraints identified in previous steps.

```
clinic = """
    CREATE TABLE Clinic(
    clinicNo VARCHAR(3)
                        PRIMARY KEY
                        NOT NULL
                        UNIQUE
                        CHECK(clinicNo GLOB '[A-Z][0-9][0-9]'),
    clinicName VARCHAR(256)
                        NOT NULL,
    address VARCHAR(256)
                        NOT NULL
                        UNIQUE,
    phoneNumber INT
                        NOT NULL
                        UNIQUE
                        CHECK(LENGTH(phoneNumber) = 10),
    managedBy VARCHAR(3)
                        NOT NULL,
    FOREIGN KEY(managedBy) REFERENCES Staff(staffNo)
                        ON DELETE SET NULL
                        ON UPDATE CASCADE
    );
    """
```

```
staff = """
    CREATE TABLE Staff(
    staffNo VARCHAR(3)
                        PRIMARY KEY
                        NOT NULL
                        UNIQUE
                        CHECK(staffNo GLOB '[A-Z][0-9][0-9]'),
    name VARCHAR(256)
                        NOT NULL,
    address VARCHAR(256),
    phoneNumber INT
                        CHECK(LENGTH(phoneNumber) = 10),
    dOB DATE
                        CHECK(dOB < '2022-12-08'),
    position VARCHAR(256)
                        NOT NULL,
    salary INT,
    clinicNo VARCHAR(3)
                        NOT NULL,
    FOREIGN KEY(clinicNo) REFERENCES Clinic
                        ON DELETE SET NULL
                        ON UPDATE CASCADE
    );
"""
```

```
owner = """
    CREATE TABLE Owner(
    ownerNo VARCHAR(3)
                    PRIMARY KEY
                    NOT NULL
                    UNIQUE
                    check(ownerNo GLOB '[A-Z][0-9][0-9]'),
    name VARCHAR(256)
                    NOT NULL,
    address VARCHAR(256),
    phoneNumber INT
                    CHECK(LENGTH(phoneNumber) = 10)
    );
"""
```

```
pet = """
    CREATE TABLE Pet(
    petNo VARCHAR(3)
                    PRIMARY KEY
                    NOT NULL
                    UNIQUE
                    check(petNo GLOB '[A-Z][0-9][0-9]'),
    name VARCHAR(256)
                    NOT NULL,
    dOB DATE
                    CHECK(dOB < '2022-12-08'),
    species VARCHAR(256),
    breed VARCHAR(256),
    color VARCHAR(256),
    clinicNo VARCHAR(3)
                    NOT NULL,
    ownerNo VARCHAR(3)
                    NOT NULL,
    FOREIGN KEY(clinicNo) REFERENCES Clinic
                    ON DELETE SET NULL
                    ON UPDATE CASCADE,
    FOREIGN KEY(ownerNo) REFERENCES Owner
                    ON DELETE SET NULL
                    ON UPDATE CASCADE
    );
"""
```

```
examination = """
    CREATE TABLE Examination(
    examNo VARCHAR(3)
                    PRIMARY KEY
                    NOT NULL
                    UNIQUE
                    check(examNo GLOB '[A-Z][0-9][0-9]'),
    chiefComplient VARCHAR(256),
    description VARCHAR(256),
    dateSeen DATE
                    CHECK(dateSeen < '2022-12-08'),
    actionsTaken VARCHAR(256),
    staffNo
                    NOT NULL,
    petNo
                    NOT NULL,
    FOREIGN KEY(staffNo) REFERENCES Staff
                    ON DELETE SET NULL
                    ON UPDATE CASCADE,
     FOREIGN KEY(petNo) REFERENCES Pet
                    ON DELETE SET NULL
                    ON UPDATE CASCADE
    );
"""
```

b.) Create at least 5 tuples for each relation in your database.

```
#------------------------ INSERTS FOR CLINIC --------------------------

clinic = """
    INSERT INTO Clinic
    VALUES(
        "C01",
        "Pawsome Clinic Miami",
        "3787 Thomas Ave Miami, FL 33133",
        7817402661,
        "S01"
    );
    """
cursor.execute(clinic)

clinic = """
    INSERT INTO Clinic
    VALUES(
        "C02",
        "Pawsome Clinic Boston",
        "193 Newbridge Street Hingham, MA 02043",
        3392365308,
        "S02"
    )
    """
cursor.execute(clinic)

clinic = """
    INSERT INTO Clinic
    VALUES(
        "C03",
        "Pawsome Clinic Los Angeles",
        "55 Newbury Street Los Angeles, CA 51234",
        7325983162,
        "S03"
    )
    """
cursor.execute(clinic)

clinic = """
    INSERT INTO Clinic
    VALUES(
        "C04",
        "Pawsome Clinic Coral Gables",
        "6240 SW 88th Street Coral Gables, FL 33166",
        1158029160,
        "S04"
    )
    """
cursor.execute(clinic)

clinic = """
    INSERT INTO Clinic
    VALUES(
        "C05",
        "Pawsome Clinic Dallas",
        "67 Adams Drive Dallas, TX 75001",
        6125903573,
        "S05"
    )
    """
cursor.execute(clinic)
```

```
#---------------------- INSERTS FOR STAFF -------------------------

staff = """
    INSERT INTO Staff
    VALUES(
        "S01",
        "John Cena",
        "50 Pine Road Miami, FL 33133",
        7817964291,
        '2001-01-22',
        "Manager",
        93000,
        "C01"
        );
"""
cursor.execute(staff)

staff = """
    INSERT INTO Staff
    VALUES(
        "S02",
        "Katie Farrell",
        "58 Foxrun Drive Bolingbrook, IL 60440",
        4135259062,
        '1993-06-15',
        "Manager",
        87000,
        "C02"
        );
"""
cursor.execute(staff)

staff = """
    INSERT INTO Staff
    VALUES(
        "S03",
        "Bob Sagget",
        "8137 Oxford Street Xenia, OH 45385",
        3529660174,
        '1988-03-01',
        "Manager",
        62000,
        "C03"
        );
"""
cursor.execute(staff)


staff = """
    INSERT INTO Staff
    VALUES(
        "S04",
        "Cameron Johnson",
        "268 Amerige Street Doylestown, PA 18901",
        6394201964,
        '2002-11-18',
        "Manager",
        120000,
        "C04"
        );
"""
cursor.execute(staff)
```

```
staff = """
    INSERT INTO Staff
    VALUES(
        "S05",
        "Mary Poppins",
        "9113 Beaver Ridge Drive Worcester, MA 01604",
        7817964291,
        '2000-03-18',
        "L",
        96000,
        "C05"
        );
"""
cursor.execute(staff)

staff = """
    INSERT INTO Staff
    VALUES(
        "S06",
        "Harry Lewis",
        "241 Marvon Road West Bend, WI 53095",
        9303383274,
        '1976-09-17',
        "Veterinarian",
        230000,
        "C01"
        );
"""
cursor.execute(staff)

staff = """
    INSERT INTO Staff
    VALUES(
        "S07",
        "David Letterman",
        "969 Mayflower Street Wasilla, AK 99654",
        6522550433,
        '1992-06-10',
        "Veterinary Assistant",
        32000,
        "C01"
        );
"""
cursor.execute(staff)

staff = """
    INSERT INTO Staff
    VALUES(
        "S08",
        "James Bond",
        "9304 West Ridgewood Street Arvada, CO 80003",
        3187925431,
        '2000-03-18',
        "Veterinary Technician",
        152000,
        "C01"
        );
"""
cursor.execute(staff)
```

```
#------------------------ INSERTS FOR OWNER --------------------------

owner = """
    INSERT INTO Owner
    VALUES(
        "O01",
        "Jeffrey Bubbles",
        "510 Fawn Street Temple Hills, MD 20748",
        6270848737
    );
"""
cursor.execute(owner)

owner = """
    INSERT INTO Owner
    VALUES(
        "O02",
        "Courtney Lawson",
        "7 Canal Street Fayetteville, NC 28303",
        3371947770
    );
"""
cursor.execute(owner)

owner = """
    INSERT INTO Owner
    VALUES(
        "O03",
        "Tom Brady",
        "8409 Marsh Drive Villa Park, IL 60181",
        6919385756
    );
"""
cursor.execute(owner)

owner = """
    INSERT INTO Owner
    VALUES(
        "O04",
        "Kelly Smith",
        "665 Alderwood Street Baldwin, NY 11510",
        4985693185
    );
"""
cursor.execute(owner)

owner = """
    INSERT INTO Owner
    VALUES(
        "O05",
        "Aaron Nesmith",
        "9314 Fifth Drive Matawan, NJ 07747",
        3749689110
    );
"""
cursor.execute(owner)
```

```
#---------------------- INSERTS FOR PET -------------------------

pet = """
    INSERT INTO Pet
    Values(
        "P01",
        "Rex",
        '2012-09-19',
        "Dog",
        "German Shepherd",
        "Brown",
        "C04",
        "O01"
    );
"""
cursor.execute(pet)

pet = """
    INSERT INTO Pet
    Values(
        "P02",
        "Lucy",
        '2014-03-01',
        "Cat",
        "Bombay Cat",
        "Black",
        "C04",
        "O01"
    );
"""
cursor.execute(pet)

pet = """
    INSERT INTO Pet
    Values(
        "P03",
        "Hopps",
        '2020-03-22',
        "Rabbit",
        "American Fuzzy Hop",
        "White",
        "C02",
        "O05"
    );
"""
cursor.execute(pet)

pet = """
    INSERT INTO Pet
    Values(
        "P04",
        "Roxy",
        '2018-13-12',
        "Dog",
        "Poodle",
        "Orange",
        "C01",
        "O03"
    );
"""
cursor.execute(pet)

pet = """
    INSERT INTO Pet
    Values(
        "P05",
        "Todd",
        '2016-12-21',
        "Guinea Pig",
        "Teddy Guinea Pig",
        "Brown",
        "C03",
        "O04"
    );
"""
cursor.execute(pet)
```

```
#---------------------- INSERTS FOR EXAMINATION --------------------------

examination = """
    INSERT INTO Examination
    Values(
        "E01",
        "Patient had an ear infection",
        "Patient was checked in both ears and given medicaton to take for infection",
        '2022-08-23',
        "a treatment was perscribed",
        "S04",
        "P01"
    );
"""
cursor.execute(examination)

examination = """
    INSERT INTO Examination
    Values(
        "E02",
        "Annual Checkup",
        "Patient's height and weight were measured, vaccination shots were given",
        '2021-11-30',
        "tests were ordered, treatment was perscribed",
        "S04",
        "P02"
    );
"""
cursor.execute(examination)

examination = """
    INSERT INTO Examination
    Values(
        "E03",
        "Patient had not been eating",
        "Patient was checked for stomach issues, perscribed special food",
        '2019-02-25',
        "tests were ordered, treatment was perscribed",
        "S02",
        "P03"
    );
"""
cursor.execute(examination)

examination = """
    INSERT INTO Examination
    Values(
        "E04",
        "Patient had an upset stomach",
        "Patient was checked for stomach bacteria or parasites",
        '2022-04-01',
        "tests were ordered",
        "S06",
        "P04"
    );
"""
cursor.execute(examination)

examination = """
    INSERT INTO Examination
    Values(
        "E05",
        "Patient had been limping",
        "X-Ray scans were given, found fracture in front right leg",
        '2020-05-16',
        "tests were ordered",
        "S03",
        "P05"
    );
"""
cursor.execute(examination)
```

Code for printing out each relation and its contents

```
#Printing out all relations
#CLINIC
print("------------------------ DATABASE RELATIONS ------------------------")
print("Clinic")
print("------------------------------------------------------------")

clinicRelation = """
    SELECT *
    FROM Clinic
"""
cursor.execute(clinicRelation)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")

#STAFF
print("Staff")
print("------------------------------------------------------------")

staffRelation = """
    SELECT *
    FROM Staff
"""
cursor.execute(staffRelation)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")

#OWNER
print("Owner")
print("------------------------------------------------------------")

ownerRelation = """
    SELECT *
    FROM Owner
"""
cursor.execute(ownerRelation)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")
```

```
#PET
print("Pet")
print("------------------------------------------------------------")

petRelation = """
    SELECT *
    FROM Pet
"""
cursor.execute(petRelation)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")

#EXAMINATION
print("Examination")
print("------------------------------------------------------------")

examinationRelation = """
    SELECT *
    FROM Examination
"""
cursor.execute(examinationRelation)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")
```

Output of all relations and their contents

```
---------------------- DATABASE RELATIONS ----------------------
Clinic
-----------------------------------------------------
  clinicNo                 clinicName                                  address  phoneNumber managedBy
0      C01        Pawsome Clinic Miami            3787 Thomas Ave Miami, FL 33133   7817402661       S01
1      C02       Pawsome Clinic Boston      193 Newbridge Street Hingham, MA 02043   3392365308       S02
2      C03   Pawsome Clinic Los Angeles     55 Newbury Street Los Angeles, CA 51234   7325983162       S03
3      C04  Pawsome Clinic Coral Gables  6240 SW 88th Street Coral Gables, FL 33166   1158029160       S04
4      C05        Pawsome Clinic Dallas            67 Adams Drive Dallas, TX 75001   6125903573       S05

Staff
-----------------------------------------------------------
  staffNo            name                                  address  phoneNumber         dOB               position  salary clinicNo
0     S01        John Cena               50 Pine Road Miami, FL 33133   7817964291  2001-01-22                Manager   93000      C01
1     S02    Katie Farrell        58 Foxrun Drive Bolingbrook, IL 60440   4135259062  1993-06-15                Manager   87000      C02
2     S03       Bob Sagget           8137 Oxford Street Xenia, OH 45385   3529660174  1988-03-01                Manager   62000      C03
3     S04  Cameron Johnson      268 Amerige Street Doylestown, PA 18901   6394201964  2002-11-18                Manager  120000      C04
4     S05     Mary Poppins  9113 Beaver Ridge Drive Worcester, MA 01604   7817964291  2000-03-18                      L   96000      C05
5     S06      Harry Lewis          241 Marvon Road West Bend, WI 53095   9303383274  1976-09-17            Veterinarian  230000      C01
6     S07  David Letterman       969 Mayflower Street Wasilla, AK 99654   6522550433  1992-06-10   Veterinary Assistant   32000      C01
7     S08       James Bond  9304 West Ridgewood Street Arvada, CO 80003   3187925431  2000-03-18  Veterinary Technician  152000      C01

Owner
-----------------------------------------------------
  ownerNo            name                                address  phoneNumber
0     O01  Jeffrey Bubbles  510 Fawn Street Temple Hills, MD 20748   6270848737
1     O02  Courtney Lawson   7 Canal Street Fayetteville, NC 28303   3371947770
2     O03        Tom Brady   8409 Marsh Drive Villa Park, IL 60181   6919385756
3     O04      Kelly Smith  665 Alderwood Street Baldwin, NY 11510   4985693185
4     O05    Aaron Nesmith      9314 Fifth Drive Matawan, NJ 07747   3749689110

Pet
-----------------------------------------------------------
  petNo   name         dOB     species              breed   color clinicNo ownerNo
0   P01    Rex  2012-09-19         Dog     German Shepherd   Brown      C04     O01
1   P02   Lucy  2014-03-01         Cat          Bombay Cat   Black      C04     O01
2   P03  Hopps  2020-03-22      Rabbit  American Fuzzy Hop   White      C02     O05
3   P04   Roxy  2018-13-12         Dog              Poodle  Orange      C01     O03
4   P05   Todd  2016-12-21  Guinea Pig    Teddy Guinea Pig   Brown      C03     O04

Examination
-----------------------------------------------------------
  examNo               chiefComplient                                    description    dateSeen                           actionsTaken staffNo petNo
0    E01  Patient had an ear infection  Patient was checked in both ears and given med...  2022-08-23                a treatment was perscribed     S04   P01
1    E02              Annual Checkup  Patient's height and weight were measured, vac...  2021-11-30  tests were ordered, treatment was perscribed     S04   P02
2    E03   Patient had not been eating  Patient was checked for stomach issues, perscr...  2019-02-25  tests were ordered, treatment was perscribed     S02   P03
3    E04  Patient had an upset stomach  Patient was checked for stomach bacteria or pa...  2022-04-01                        tests were ordered     S06   P04
4    E05      Patient had been limping  X-Ray scans were given, found fracture in fron...  2020-05-16                        tests were ordered     S03   P05
```

c.) Develop 5 SQL queries using embedded SQL

```
#---------------------------------- QUERIES ---------------------------------------------------
print("------------------------ QUERIES -------------------------")

#-------------- QUERY 1 -------------------
print("------------------- QUERY 1 -------------------")

#List the name position, and salary of staff members who make more than $100,000 annually. order by salary descending

query = """
    SELECT name, position, salary
    FROM Staff S
    WHERE S.salary > 100000
    ORDER BY S.salary DESC;
"""
cursor.execute(query)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")



#-------------- QUERY 2 -------------------
print("------------------- QUERY 2 -------------------")

#List the names of all of the owners who own dogs

query = """
    SELECT O.name Owner_Name
    FROM Owner O, Pet P
    WHERE O.ownerNo = P.ownerNo AND p.species = "Dog";
"""
cursor.execute(query)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")
```

```
#------------------ QUERY 3 ------------------
print("------------------ QUERY 3 ------------------")

#List the names and phone numbers of all staff that manage a branch and the name and phone number of the branch they manage
query = """
    SELECT C.clinicName Clinic_Name, C.phoneNumber Clinic_Phone_Number, S.name Staff_Name, S.phoneNumber Staff_Phone_Number
    FROM Clinic C, Staff S
    WHERE C.managedBy = S.staffNo;
"""
cursor.execute(query)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")



#------------------ QUERY 4 ------------------
print("------------------ QUERY 4 ------------------")

#List the dates and chiefComplients of all examinations done in the last 2 years. also list the name of pet that the examination was done on and the name of the owner that owns that pet
query = """
    SELECT O.name Owner_Name, P.name Pet_Name, E.chiefComplient Chief_Complient, E.dateSeen Date_Seen
    FROM Owner O, Examination E, Pet P
    WHERE O.ownerNo = P.ownerNo AND P.petNo = E.petNo AND E.dateSeen >= '2020-12-08'
"""
cursor.execute(query)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")
```

```
#------------------ QUERY 5 ------------------
print("------------------ QUERY 5 ------------------")

#Find the average salary of all staff members that work at a clinic with the word "street" in the address
query = """
    SELECT AVG(S.salary)
    FROM Staff S, Clinic C
    WHERE S.clinicNo = C.clinicNo AND C.address LIKE '%Street%'
"""
cursor.execute(query)

# Extract column names from cursor
column_names = [row[0] for row in cursor.description]

# Fetch data and load into a pandas dataframe
table_data = cursor.fetchall()
df = pd.DataFrame(table_data, columns=column_names)

# Examine dataframe
print(df)
print(" ")
```

Output of all queries

```
------------------------ QUERIES ------------------------
------------------ QUERY 1 ------------------
              name              position  salary
0      Harry Lewis          Veterinarian  230000
1       James Bond  Veterinary Technician  152000
2  Cameron Johnson               Manager  120000

------------------ QUERY 2 ------------------
        Owner_Name
0  Jeffrey Bubbles
1        Tom Brady

------------------ QUERY 3 ------------------
                  Clinic_Name  Clinic_Phone_Number       Staff_Name  Staff_Phone_Number
0         Pawsome Clinic Miami           7817402661        John Cena          7817964291
1        Pawsome Clinic Boston           3392365308    Katie Farrell          4135259062
2   Pawsome Clinic Los Angeles           7325983162       Bob Sagget          3529660174
3  Pawsome Clinic Coral Gables           1158029160  Cameron Johnson          6394201964
4        Pawsome Clinic Dallas           6125903573     Mary Poppins          7817964291

------------------ QUERY 4 ------------------
        Owner_Name Pet_Name               Chief_Complient   Date_Seen
0  Jeffrey Bubbles      Rex  Patient had an ear infection  2022-08-23
1  Jeffrey Bubbles     Lucy                Annual Checkup  2021-11-30
2        Tom Brady     Roxy  Patient had an upset stomach  2022-04-01

------------------ QUERY 5 ------------------
   AVG(S.salary)
0   89666.666667
```

d.) https://github.com/DavidMills2019/CSC423-Final-Project.git