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CSC 423 Database Systems
Group Project Part 3

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

```
query = """
    CREATE TABLE Client(
    ClientNum INT NOT NULL,
    fName VARCHAR(50),
    lName VARCHAR(50),
    address VARCHAR(100),
    number VARCHAR(10),
    PRIMARY KEY(ClientNum)
    );
    """
#ON DELETE CASCADE will delete all of the children of the main tables
# Execute query, the result is stored in cursor
cursor.execute(query)

query = """
    CREATE TABLE Equipment(
    eqID INT,
    description VARCHAR(500),
    usage INT NOT NULL,
    cost FLOAT,
    CONSTRAINT AllowedCost CHECK (cost >= 0)
    CONSTRAINT TimesUsed CHECK (usage >= 0)
    PRIMARY KEY (eqID)
    );
    """
cursor.execute(query)

#CONSTRAINT FOR PHONE NUMBER BEING 10 DIGITS?
query = """
    CREATE TABLE Employee(
    staffNum INT,
    fName VARCHAR(50),
    lName VARCHAR(50),
    address VARCHAR(100),
    salary FLOAT CHECK(salary > 0),
    number INT,
    PRIMARY KEY(staffNum)
    );
    """
cursor.execute(query)
## DOES REQUIREMENT HAVE CLIENTNUM FOREIGN KEY HERE LIKE ER DIAGRAM??
query = """
    CREATE TABLE Requirement(
    reqID INT,
    startD DATE,
    startT TIME,
    duration TIME,
    clientNum INT,
    comments VARCHAR(500),
    PRIMARY KEY (reqID)
    FOREIGN KEY (clientNum) REFERENCES Client(clientNum)
    );
    """
cursor.execute(query)
```

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

```
query = """
    INSERT INTO Employee
    VALUES
        (1, 'Alice', 'Johnson', '789 Oak St', 30000, 3456789012),
        (2, 'Bob', 'Williams', '101 Pine St', 32000, 4567890123),
        (3, 'John', 'Ronaldo', '134 Po St', 35000, 4566960123),
        (4, 'Lionel', 'Messi', '563 Po St', 33000, 6566960123),
        (5, 'Lebron', 'James', '431 Spruce St', 31000, 4566966423);
    """
cursor.execute(query)

query= """
    INSERT INTO Equipment
    VALUES
        (1, 'Vacuum Cleaner', 20, 150.00),
        (2, 'Mop', 9, 20.00),
        (3, 'Broom', 26, 25.00),
        (4, 'Duster', 11, 50.00),
        (5, 'Plunger', 32, 20.00);
"""
cursor.execute(query)

query = """
    INSERT INTO Client
    VALUES
        (1, 'John', 'Doe', '123 Main St', 1234567890),
        (2, 'Jane', 'Smith', '456 Elm St', 2345678901),
        (3, 'Anne', 'Wolf', '573 Palm Dr', 3057836721),
        (4, 'Maria', 'Wolf', '7025 89th St', 3055312756),
        (5, 'Carly', 'Hess', '562 45th Pl', 7864539877);
"""
cursor.execute(query)

query = """
    INSERT INTO Requirement
    VALUES
        (1, '2024-01-03', '10:30:00', 'Clean bathroom', 4 , 5),
        (2, '2023-12-02', '09:00:00', 'Wash windows', 2, 4),
        (3, '2023-10-02', '07:00:00' ,'Wash floor', 2 , 3),
        (4, '2022-10-22', '05:00:00', 'Clean Kitchen', 1 , 2),
        (5, '2023-05-16', '11:15:00', 'Clean floor tile', 3 , 1);
"""
cursor.execute(query)
```

```
   ClientNum  fName  lName       address      number
0          1   John    Doe   123 Main St  1234567890
1          2   Jane  Smith    456 Elm St  2345678901
2          3   Anne   Wolf   573 Palm Dr  3057836721
3          4  Maria   Wolf  7025 89th St  3055312756
4          5  Carly   Hess   562 45th Pl  7864539877
Index(['ClientNum', 'fName', 'lName', 'address', 'number'], dtype='object')


   staffNum   fName     lName        address   salary      number
0         1   Alice   Johnson     789 Oak St  30000.0  3456789012
1         2     Bob  Williams    101 Pine St  32000.0  4567890123
2         3    John   Ronaldo      134 Po St  35000.0  4566960123
3         4  Lionel     Messi      563 Po St  33000.0  6566960123
4         5  Lebron     James  431 Spruce St  31000.0  4566966423
Index(['staffNum', 'fName', 'lName', 'address', 'salary', 'number'], dtype='object')


   reqID      startD    startT          duration  clientNum comments
0      1  2024-01-03  10:30:00    Clean bathroom          4        5
1      2  2023-12-02  09:00:00      Wash windows          2        4
2      3  2023-10-02  07:00:00        Wash floor          2        3
3      4  2022-10-22  05:00:00     Clean Kitchen          1        2
4      5  2023-05-16  11:15:00  Clean floor tile          3        1
Index(['reqID', 'startD', 'startT', 'duration', 'clientNum', 'comments'], dtype='object')


   eqID     description  usage   cost
0     1  Vacuum Cleaner     20  150.0
1     2             Mop      9   20.0
2     3           Broom     26   25.0
3     4          Duster     11   50.0
4     5         Plunger     32   20.0
Index(['eqID', 'description', 'usage', 'cost'], dtype='object')
```

c. **Develop 5 SQL queries using embedded SQL**

```
#Retrieve Client Name with Their Cleaning Start Date and Time
query = """
    SELECT Client.fName, Client.lName, Requirement.StartD, Requirement.startT
    FROM Client
    JOIN Requirement ON Client.clientNum = Requirement.clientNum;
 """
cursor.execute(query)
print_table(cursor)

#calculate total salary expense for all employees
query = """
SELECT SUM(E.salary) AS TotalSalaryExpense
FROM Employee E;
   """
cursor.execute(query)
print_table(cursor)

#retrieve all requirements along with client information
query = """
    SELECT
        R.reqID,
        R.startD,
        R.startT,
        R.duration,
        R.comments,
        C.fName AS ClientFirstName,
        C.lName AS ClientLastName
    FROM Requirement R
    JOIN Client C ON R.ClientNum = C.ClientNum;
"""
cursor.execute(query)
print_table(cursor)

#Find clients with no cleaning requirements
query = """
SELECT
    C.ClientNum,
    C.fName,
    C.lName
FROM Client C
LEFT JOIN Requirement R ON C.ClientNum = R.ClientNum
WHERE R.reqID IS NULL;
"""
cursor.execute(query)
print_table(cursor)

#Number of services scheduled in 2024
query =    """
SELECT  *
    FROM Requirement r
    WHERE startD LIKE '%2024%';
"""
cursor.execute(query)
print_table(cursor)
```

```
   fName  lName      startD    startT
0  Maria   Wolf  2024-01-03  10:30:00
1   Jane  Smith  2023-12-02  09:00:00
2   Jane  Smith  2023-10-02  07:00:00
3   John    Doe  2022-10-22  05:00:00
4   Anne   Wolf  2023-05-16  11:15:00
Index(['fName', 'lName', 'startD', 'startT'], dtype='object')


   TotalSalaryExpense
0            161000.0
Index(['TotalSalaryExpense'], dtype='object')


   reqID      startD    startT          duration comments ClientFirstName ClientLastName
0      1  2024-01-03  10:30:00    Clean bathroom        5           Maria           Wolf
1      2  2023-12-02  09:00:00      Wash windows        4            Jane          Smith
2      3  2023-10-02  07:00:00        Wash floor        3            Jane          Smith
3      4  2022-10-22  05:00:00     Clean Kitchen        2            John            Doe
4      5  2023-05-16  11:15:00  Clean floor tile        1            Anne           Wolf
Index(['reqID', 'startD', 'startT', 'duration', 'comments', 'ClientFirstName',
       'ClientLastName'],
      dtype='object')


   ClientNum  fName lName
0          5  Carly  Hess
Index(['ClientNum', 'fName', 'lName'], dtype='object')


   reqID      startD    startT        duration  clientNum comments
0      1  2024-01-03  10:30:00  Clean bathroom          4        5
Index(['reqID', 'startD', 'startT', 'duration', 'clientNum', 'comments'], dtype='object')
```

d. **Upload all the code and documentation to GitHub**

Link: