STEP 3 → https://github.com/Mkovshov/CSC423_Project.git
Table Creation:

CLIENT TABLE:

```
CREATE TABLE Client (
   clientNumber INTEGER PRIMARY KEY,
   firstName TEXT NOT NULL,
   lastName TEXT NOT NULL,
   street TEXT,
   city TEXT,
   postCode TEXT,
   telephoneNumber TEXT NOT NULL CHECK (telephoneNumber GLOB '[0-9]*')
);
```

EMPLOYEE TABLE:

```
CREATE TABLE Employee (
   staffNumber INTEGER PRIMARY KEY,
   firstName TEXT NOT NULL,
   lastName TEXT NOT NULL,
   street TEXT,
   city TEXT,
   postCode TEXT,
   salary REAL NOT NULL CHECK (salary > 0),
   telephoneNumber TEXT NOT NULL CHECK (telephoneNumber GLOB '[0-9]*')
);
```

SERVICE_REQUIREMENT TABLE:

```
CREATE TABLE Service_Requirement (
   requirementId INTEGER PRIMARY KEY,
   clientNumber INTEGER NOT NULL,
   startDate TEXT NOT NULL,
   startTime TEXT NOT NULL,
   duration INTEGER NOT NULL CHECK (duration > 0),
   comments TEXT,
   FOREIGN KEY (clientNumber) REFERENCES Client(clientNumber)
);
```

EQUIPMENT TABLE:

```
CREATE TABLE Equipment (
   equipmentId INTEGER PRIMARY KEY,
   usage TEXT,
   cost REAL NOT NULL CHECK (cost >= 0),
   description TEXT NOT NULL
);
```

ASSIGNMENT TABLE:

```
CREATE TABLE Assignment (
   staffNumber INTEGER NOT NULL,
   requirementId INTEGER NOT NULL,
   PRIMARY KEY (staffNumber, requirementId),
   FOREIGN KEY (staffNumber) REFERENCES Employee(staffNumber),
   FOREIGN KEY (requirementId) REFERENCES Service_Requirement(requirementId)
);
```

REQUIREMENT_EQUIPMENT TABLE:

```
CREATE TABLE Requirement_Equipment (
   requirementId INTEGER NOT NULL,
   equipmentId INTEGER NOT NULL,
   quantity INTEGER NOT NULL CHECK (quantity > 0),
   PRIMARY KEY (requirementId, equipmentId),
   FOREIGN KEY (requirementId) REFERENCES Service_Requirement(requirementId),
   FOREIGN KEY (equipmentId) REFERENCES Equipment(equipmentId)
);
```

```python
# 1. CLIENT TABLE
cursor.execute('''
CREATE TABLE IF NOT EXISTS Client (
    clientNumber INTEGER PRIMARY KEY,
    firstName TEXT NOT NULL,
    lastName TEXT NOT NULL,
    street TEXT,
    city TEXT,
    postCode TEXT,
    telephoneNumber TEXT NOT NULL CHECK (telephoneNumber GLOB '[0-9]*')
)
''')

# 2. EMPLOYEE TABLE
cursor.execute('''
CREATE TABLE IF NOT EXISTS Employee (
    staffNumber INTEGER PRIMARY KEY,
    firstName TEXT NOT NULL,
    lastName TEXT NOT NULL,
    street TEXT,
    city TEXT,
    postCode TEXT,
    salary REAL NOT NULL CHECK (salary > 0),
    telephoneNumber TEXT NOT NULL CHECK (telephoneNumber GLOB '[0-9]*')
)
''')

# 3. SERVICE_REQUIREMENT TABLE
cursor.execute('''
CREATE TABLE IF NOT EXISTS Service_Requirement (
    requirementId INTEGER PRIMARY KEY,
    clientNumber INTEGER NOT NULL,
    startDate TEXT NOT NULL,
    startTime TEXT NOT NULL,
    duration INTEGER NOT NULL CHECK (duration > 0),
    comments TEXT,
    FOREIGN KEY (clientNumber) REFERENCES Client(clientNumber)
)
''')

# 4. EQUIPMENT TABLE
cursor.execute('''
CREATE TABLE IF NOT EXISTS Equipment (
    equipmentId INTEGER PRIMARY KEY,
    usage TEXT,
    cost REAL NOT NULL CHECK (cost >= 0),
    description TEXT NOT NULL
)
''')

# 5. ASSIGNMENT TABLE
cursor.execute('''
CREATE TABLE IF NOT EXISTS Assignment (
    staffNumber INTEGER NOT NULL,
    requirementId INTEGER NOT NULL,
    PRIMARY KEY (staffNumber, requirementId),
    FOREIGN KEY (staffNumber) REFERENCES Employee(staffNumber),
    FOREIGN KEY (requirementId) REFERENCES Service_Requirement(requirementId)
)
''')

# 6. REQUIREMENT_EQUIPMENT TABLE
cursor.execute('''
CREATE TABLE IF NOT EXISTS Requirement_Equipment (
    requirementId INTEGER NOT NULL,
    equipmentId INTEGER NOT NULL,
    quantity INTEGER NOT NULL CHECK (quantity > 0),
    PRIMARY KEY (requirementId, equipmentId),
    FOREIGN KEY (requirementId) REFERENCES Service_Requirement(requirementId),
    FOREIGN KEY (equipmentId) REFERENCES Equipment(equipmentId)
)
''')
```

Sample Data insertion:

INSERT CLIENTS:
INSERT INTO Client VALUES (1001, 'John', 'Doe', '123 Main St', 'Boston', '02101', '6175551001');
INSERT INTO Client VALUES (1002, 'Jane', 'Smith', '456 Oak Ave', 'Cambridge', '02138', '6175551002');
INSERT INTO Client VALUES (1003, 'Robert', 'Johnson', '789 Pine Rd', 'Somerville', '02143', '6175551003');
INSERT INTO Client VALUES (1004, 'Sarah', 'Williams', '321 Elm St', 'Boston', '02115', '6175551004');
INSERT INTO Client VALUES (1005, 'Michael', 'Brown', '654 Maple Dr', 'Cambridge', '02139', '6175551005');
INSERT INTO Client VALUES (1006, 'Emily', 'Davis', '987 Birch Ln', 'Boston', '02108', '6175551006');

INSERT EMPLOYEES:
INSERT INTO Employee VALUES (5001, 'Alice', 'Wilson', '111 First St', 'Boston', '02101', 45000.00, '6175552001');
INSERT INTO Employee VALUES (5002, 'Bob', 'Miller', '222 Second Ave', 'Cambridge', '02138', 42000.00, '6175552002');
INSERT INTO Employee VALUES (5003, 'Carol', 'Taylor', '333 Third Rd', 'Somerville', '02143', 48000.00, '6175552003');
INSERT INTO Employee VALUES (5004, 'David', 'Anderson', '444 Fourth St', 'Boston', '02115', 46000.00, '6175552004');
INSERT INTO Employee VALUES (5005, 'Eva', 'Thomas', '555 Fifth Dr', 'Cambridge', '02139', 44000.00, '6175552005');
INSERT INTO Employee VALUES (5006, 'Frank', 'Jackson', '666 Sixth Ln', 'Boston', '02108', 47000.00, '6175552006');

INSERT SERVICE REQUIREMENTS:
INSERT INTO Service_Requirement VALUES (2001, 1001, '2024-12-09', '07:00', 120, 'Morning cleaning');
INSERT INTO Service_Requirement VALUES (2002, 1001, '2024-12-09', '17:00', 120, 'Evening cleaning');
INSERT INTO Service_Requirement VALUES (2003, 1002, '2024-12-10', '10:00', 180, 'Weekly deep clean');
INSERT INTO Service_Requirement VALUES (2004, 1003, '2024-12-11', '08:00', 90, 'Kitchen cleaning');

INSERT INTO Service_Requirement VALUES (2005, 1004, '2024-12-12', '14:00', 60, 'Quick cleanup');
INSERT INTO Service_Requirement VALUES (2006, 1005, '2024-12-13', '09:00', 240, 'Full day service');

INSERT EQUIPMENT:
INSERT INTO Equipment VALUES (3001, 'Daily', 1200.50, 'Industrial vacuum cleaner');
INSERT INTO Equipment VALUES (3002, 'Weekly', 850.00, 'Floor polisher');
INSERT INTO Equipment VALUES (3003, 'As needed', 350.75, 'Carpet cleaner');
INSERT INTO Equipment VALUES (3004, 'Daily', 200.00, 'High-pressure washer');
INSERT INTO Equipment VALUES (3005, 'Monthly', 1500.00, 'Window cleaning kit');
INSERT INTO Equipment VALUES (3006, 'Weekly', 600.25, 'Sanitizing sprayer');

INSERT ASSIGNMENTS:
INSERT INTO Assignment VALUES (5001, 2001);
INSERT INTO Assignment VALUES (5002, 2001);
INSERT INTO Assignment VALUES (5003, 2002);
INSERT INTO Assignment VALUES (5004, 2003);
INSERT INTO Assignment VALUES (5005, 2004);
INSERT INTO Assignment VALUES (5006, 2005);
INSERT INTO Assignment VALUES (5001, 2006);

INSERT REQUIREMENT_EQUIPMENT:
INSERT INTO Requirement_Equipment VALUES (2001, 3001, 2);
INSERT INTO Requirement_Equipment VALUES (2001, 3002, 1);
INSERT INTO Requirement_Equipment VALUES (2002, 3001, 1);
INSERT INTO Requirement_Equipment VALUES (2003, 3003, 3);
INSERT INTO Requirement_Equipment VALUES (2004, 3004, 1);
INSERT INTO Requirement_Equipment VALUES (2005, 3005, 2);
INSERT INTO Requirement_Equipment VALUES (2006, 3006, 1);

```python
# Insert Clients
clients = [
    (1001, 'John', 'Doe', '123 Main St', 'Boston', '02101', '6175551001'),
    (1002, 'Jane', 'Smith', '456 Oak Ave', 'Cambridge', '02138', '6175551002'),
    (1003, 'Robert', 'Johnson', '789 Pine Rd', 'Somerville', '02143', '6175551003'),
    (1004, 'Sarah', 'Williams', '321 Elm St', 'Boston', '02115', '6175551004'),
    (1005, 'Michael', 'Brown', '654 Maple Dr', 'Cambridge', '02139', '6175551005'),
    (1006, 'Emily', 'Davis', '987 Birch Ln', 'Boston', '02108', '6175551006')
]
cursor.executemany('INSERT INTO Client VALUES (?, ?, ?, ?, ?, ?, ?)', clients)

# Insert Employees
employees = [
    (5001, 'Alice', 'Wilson', '111 First St', 'Boston', '02101', 45000.00, '6175552001'),
    (5002, 'Bob', 'Miller', '222 Second Ave', 'Cambridge', '02138', 42000.00, '6175552002'),
    (5003, 'Carol', 'Taylor', '333 Third Rd', 'Somerville', '02143', 48000.00, '6175552003'),
    (5004, 'David', 'Anderson', '444 Fourth St', 'Boston', '02115', 46000.00, '6175552004'),
    (5005, 'Eva', 'Thomas', '555 Fifth Dr', 'Cambridge', '02139', 44000.00, '6175552005'),
    (5006, 'Frank', 'Jackson', '666 Sixth Ln', 'Boston', '02108', 47000.00, '6175552006')
]
cursor.executemany('INSERT INTO Employee VALUES (?, ?, ?, ?, ?, ?, ?, ?)', employees)

# Insert Service Requirements
service_reqs = [
    (2001, 1001, '2024-12-09', '07:00', 120, 'Morning cleaning'),
    (2002, 1001, '2024-12-09', '17:00', 120, 'Evening cleaning'),
    (2003, 1002, '2024-12-10', '10:00', 180, 'Weekly deep clean'),
    (2004, 1003, '2024-12-11', '08:00', 90, 'Kitchen cleaning'),
    (2005, 1004, '2024-12-12', '14:00', 60, 'Quick cleanup'),
    (2006, 1005, '2024-12-13', '09:00', 240, 'Full day service')
]
cursor.executemany('INSERT INTO Service_Requirement VALUES (?, ?, ?, ?, ?, ?)', service_reqs)

# Insert Equipment
equipment = [
    (3001, 'Daily', 1200.50, 'Industrial vacuum cleaner'),
    (3002, 'Weekly', 850.00, 'Floor polisher'),
    (3003, 'As needed', 350.75, 'Carpet cleaner'),
    (3004, 'Daily', 200.00, 'High-pressure washer'),
    (3005, 'Monthly', 1500.00, 'Window cleaning kit'),
    (3006, 'Weekly', 600.25, 'Sanitizing sprayer')
]
cursor.executemany('INSERT INTO Equipment VALUES (?, ?, ?, ?)', equipment)

# Insert Assignments
assignments = [
    (5001, 2001),
    (5002, 2001),
    (5003, 2002),
    (5004, 2003),
    (5005, 2004),
    (5006, 2005),
    (5001, 2006)
]
cursor.executemany('INSERT INTO Assignment VALUES (?, ?)', assignments)

# Insert Requirement_Equipment
req_equipment = [
    (2001, 3001, 2),
    (2001, 3002, 1),
    (2002, 3001, 1),
    (2003, 3003, 3),
    (2004, 3004, 1),
    (2005, 3005, 2),
    (2006, 3006, 1)
]
cursor.executemany('INSERT INTO Requirement_Equipment VALUES (?, ?, ?)', req_equipment)
```

User Transactions:

TRANSACTION 1: Add a new client to the system

```
INSERT INTO Client VALUES (1007, 'Lisa', 'Garcia', '888 Sunset Blvd', 'Boston', '02110',
'6175551007');
```

TRANSACTION 2: Record a new service requirement for a specific client

```
INSERT INTO Service_Requirement VALUES (2007, 1007, '2024-12-14', '13:00', 90, 'Initial
consultation');
```

TRANSACTION 3: Insert a new assignment linking employee to service requirement

```
INSERT INTO Assignment VALUES (5002, 2007);
```

TRANSACTION 4: Retrieve service requirements for client 1001

```
SELECT requirementId, startDate, startTime, duration, comments
FROM Service_Requirement
WHERE clientNumber = 1001;
```

TRANSACTION 5: Retrieve all service requirements assigned to employee 5001

```
SELECT sr.requirementId, sr.startDate, sr.startTime, sr.duration,
    c.firstName, c.lastName
FROM Service_Requirement sr
JOIN Assignment a ON sr.requirementId = a.requirementId
JOIN Client c ON sr.clientNumber = c.clientNumber
WHERE a.staffNumber = 5001;
```

```
# Query 1: Add a new client
print("\n1. Add a new client to the system")
cursor.execute('''
    INSERT INTO Client VALUES (1007, 'Lisa', 'Garcia', '888 Sunset Blvd',
                               'Boston', '02110', '6175551007')
''')
print("   Added client 1007: Lisa Garcia")

# Query 2: Record a new service requirement
print("\n2. Record a new service requirement for a specific client")
cursor.execute('''
    INSERT INTO Service_Requirement VALUES
    (2007, 1007, '2024-12-14', '13:00', 90, 'Initial consultation')
''')
print("   Added service requirement 2007 for client 1007")

# Query 3: Insert a new assignment
print("\n3. Insert a new assignment linking employee to service requirement")
cursor.execute('INSERT INTO Assignment VALUES (5002, 2007)')
print("   Assigned employee 5002 to requirement 2007")

# Query 4: Retrieve service requirements for client 1001
print("\n4. Retrieve service requirements for client 1001")
cursor.execute('''
    SELECT requirementId, startDate, startTime, duration, comments
    FROM Service_Requirement
    WHERE clientNumber = 1001
''')
results = cursor.fetchall()
column_names = [row[0] for row in cursor.description]
df = pd.DataFrame(results, columns=column_names)
print(df.to_string(index=False))

# Query 5: Retrieve all service requirements assigned to employee 5001
print("\n5. Retrieve all service requirements assigned to employee 5001")
cursor.execute('''
    SELECT sr.requirementId, sr.startDate, sr.startTime, sr.duration,
           c.firstName, c.lastName
    FROM Service_Requirement sr
    JOIN Assignment a ON sr.requirementId = a.requirementId
    JOIN Client c ON sr.clientNumber = c.clientNumber
    WHERE a.staffNumber = 5001
''')
```

Code output:

```
SUPERMAIDS CLEANING COMPANY – DATABASE IMPLEMENTATION
============================================================
Sample data inserted

1. Add a new client to the system
   Added client 1007: Lisa Garcia

2. Record a new service requirement for a specific client
   Added service requirement 2007 for client 1007

3. Insert a new assignment linking employee to service requirement
   Assigned employee 5002 to requirement 2007

4. Retrieve service requirements for client 1001
 requirementId  startDate startTime  duration         comments
          2001 2024-12-09     07:00       120 Morning cleaning
          2002 2024-12-09     17:00       120 Evening cleaning

5. Retrieve all service requirements assigned to employee 5001
 requirementId  startDate startTime  duration firstName lastName
          2001 2024-12-09     07:00       120      John      Doe
          2006 2024-12-13     09:00       240   Michael    Brown

============================================================
All Table Contents
============================================================

Client:
 clientNumber firstName lastName          street       city postCode telephoneNumber
         1001      John      Doe     123 Main St     Boston    02101      6175551001
         1002      Jane    Smith     456 Oak Ave  Cambridge    02138      6175551002
         1003    Robert  Johnson     789 Pine Rd Somerville    02143      6175551003
         1004     Sarah Williams      321 Elm St     Boston    02115      6175551004
         1005   Michael    Brown    654 Maple Dr  Cambridge    02139      6175551005
         1006     Emily    Davis    987 Birch Ln     Boston    02108      6175551006
         1007      Lisa   Garcia 888 Sunset Blvd     Boston    02110      6175551007

Employee:
 staffNumber firstName lastName         street       city postCode  salary telephoneNumber
        5001     Alice   Wilson   111 First St     Boston    02101 45000.0      6175552001
        5002       Bob   Miller 222 Second Ave  Cambridge    02138 42000.0      6175552002
        5003     Carol   Taylor   333 Third Rd Somerville    02143 48000.0      6175552003
        5004     David Anderson  444 Fourth St     Boston    02115 46000.0      6175552004
        5005       Eva   Thomas   555 Fifth Dr  Cambridge    02139 44000.0      6175552005
        5006     Frank  Jackson   666 Sixth Ln     Boston    02108 47000.0      6175552006

Service_Requirement:
 requirementId  clientNumber  startDate startTime  duration           comments
          2001          1001 2024-12-09     07:00       120     Morning cleaning
          2002          1001 2024-12-09     17:00       120     Evening cleaning
          2003          1002 2024-12-10     10:00       180    Weekly deep clean
          2004          1003 2024-12-11     08:00        90     Kitchen cleaning
          2005          1004 2024-12-12     14:00        60        Quick cleanup
          2006          1005 2024-12-13     09:00       240     Full day service
          2007          1007 2024-12-14     13:00        90 Initial consultation
```

```
Equipment:
 equipmentId     usage    cost              description
        3001     Daily 1200.50 Industrial vacuum cleaner
        3002    Weekly  850.00            Floor polisher
        3003 As needed  350.75            Carpet cleaner
        3004     Daily  200.00      High-pressure washer
        3005   Monthly 1500.00       Window cleaning kit
        3006    Weekly  600.25        Sanitizing sprayer

Assignment:
 staffNumber  requirementId
        5001           2001
        5002           2001
        5003           2002
        5004           2003
        5005           2004
        5006           2005
        5001           2006
        5002           2007

Requirement_Equipment:
 requirementId  equipmentId  quantity
          2001         3001         2
          2001         3002         1
          2002         3001         1
          2003         3003         3
          2004         3004         1
          2005         3005         2
          2006         3006         1

============================================================
PROJECT PART 3 COMPLETED SUCCESSFULLY!
============================================================
```