

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)
);
```

```

# 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);
```

```

# 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;
```


Code output:

```
SUPERMAIDS CLEANING COMPANY - DATABASE IMPLEMENTATION
=====
DATABASE STATE BEFORE TRANSACTIONS
=====

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

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

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

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

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!

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