LeanyLabs on PostgreSQL/Python 3

Table of Contents

Credentials to Render's PostgreSQL database:

```
DB_HOST=dpg-cvdhn4lumphs73fkcg8g-a.frankfurt-postgres.render.com
DB_PORT=5432
DB_NAME=leanylabs_db
DB_USER=leanylabs_user
DB_PASSWORD=3s3COmP7b0z7DkhKvjhZTlgHMyXTl2pE
```

Initial JSON - employees.json:

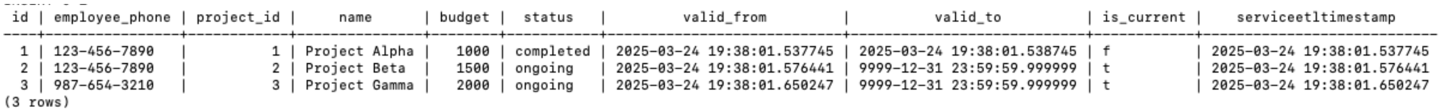
```
{
    "employees": [
        {
            "name": "John Doe",
            "phone": "123-456-7890",
            "projects": [
                {
                    "id": 1,
                    "name": "Project Alpha",
                    "budget": 1000,
                    "status": "completed"
                },
                {
                    "id": 2,
                    "name": "Project Beta",
                    "budget": 1500,
                    "status": "ongoing"
                }
            ]
        },
        {
            "name": "Jane Smith",
            "phone": "987-654-3210",
            "projects": [
                {
                    "id": 3,
                    "name": "Project Gamma",
                    "budget": 2000,
                    "status": "ongoing"
                }
            ]
        }
    ]
}
```

Step 1. Create initial tables of employees and projects with Slowly Changing Dimensions Type 2 (SCD2) to store and manage current and historical data/projects over time.

```
drop table if exists projects;

drop table if exists employees;

CREATE TABLE IF NOT EXISTS employees (
                id SERIAL PRIMARY KEY,
                name TEXT NOT NULL,
                phone TEXT UNIQUE NOT NULL,
                serviceETLTimestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP
            );

CREATE TABLE IF NOT EXISTS projects (
                id SERIAL PRIMARY KEY,
                employee_phone TEXT REFERENCES employees(phone) ON DELETE CASCADE,
                project_id INTEGER NOT NULL,
                name TEXT NOT NULL,
                budget NUMERIC NOT NULL,
                status TEXT NOT NULL,
                valid_from TIMESTAMP NOT NULL, -- SCD2
                valid_to TIMESTAMP, -- SCD2
                is_current BOOLEAN DEFAULT TRUE, -- SCD2
                serviceETLTimestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
                UNIQUE(employee_phone, project_id, is_current)  -- Prevent duplicate
projects for the same employee
            );
```

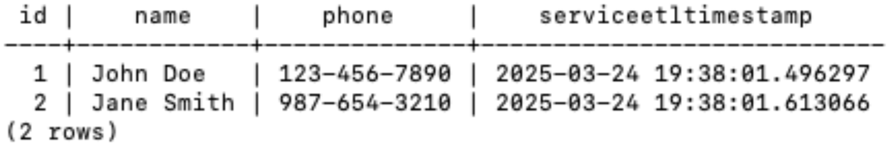
Step 2. Insert the data from initial employees.json in appropriate PostgreSQL tables employees and projects.

```
-- Insert data for John Doe
INSERT INTO employees (name, phone) VALUES ('John Doe', '123-456-7890');

-- Insert projects for John Doe
INSERT INTO projects (employee_phone, project_id, name, budget, status, valid_from,
valid_to, is_current)
VALUES ('123-456-7890', 1, 'Project Alpha', 1000, 'completed', CURRENT_TIMESTAMP,
CURRENT_TIMESTAMP + INTERVAL '1 millisecond', FALSE);

INSERT INTO projects (employee_phone, project_id, name, budget, status, valid_from,
valid_to, is_current)
VALUES ('123-456-7890', 2, 'Project Beta', 1500, 'ongoing', CURRENT_TIMESTAMP, '9999-12-
31 23:59:59.999999', TRUE);

-- Insert data for Jane Smith
INSERT INTO employees (name, phone) VALUES ('Jane Smith', '987-654-3210');

-- Insert projects for Jane Smith
INSERT INTO projects (employee_phone, project_id, name, budget, status, valid_from,
valid_to, is_current)
VALUES ('987-654-3210', 3, 'Project Gamma', 2000, 'ongoing', CURRENT_TIMESTAMP, '9999-12-
31 23:59:59.999999', TRUE);

select * from projects;
```



```
 id | employee_phone | project_id |     name      | budget |  status   |         valid_from         |          valid_to          | is_current |     serviceetltimestamp
----+----------------+------------+---------------+--------+-----------+----------------------------+----------------------------+------------+----------------------------
  1 | 123-456-7890   |          1 | Project Alpha |   1000 | completed | 2025-03-24 19:38:01.537745 | 2025-03-24 19:38:01.538745 | f          | 2025-03-24 19:38:01.537745
  2 | 123-456-7890   |          2 | Project Beta  |   1500 | ongoing   | 2025-03-24 19:38:01.576441 | 9999-12-31 23:59:59.999999 | t          | 2025-03-24 19:38:01.576441
  3 | 987-654-3210   |          3 | Project Gamma |   2000 | ongoing   | 2025-03-24 19:38:01.650247 | 9999-12-31 23:59:59.999999 | t          | 2025-03-24 19:38:01.650247
(3 rows)
```

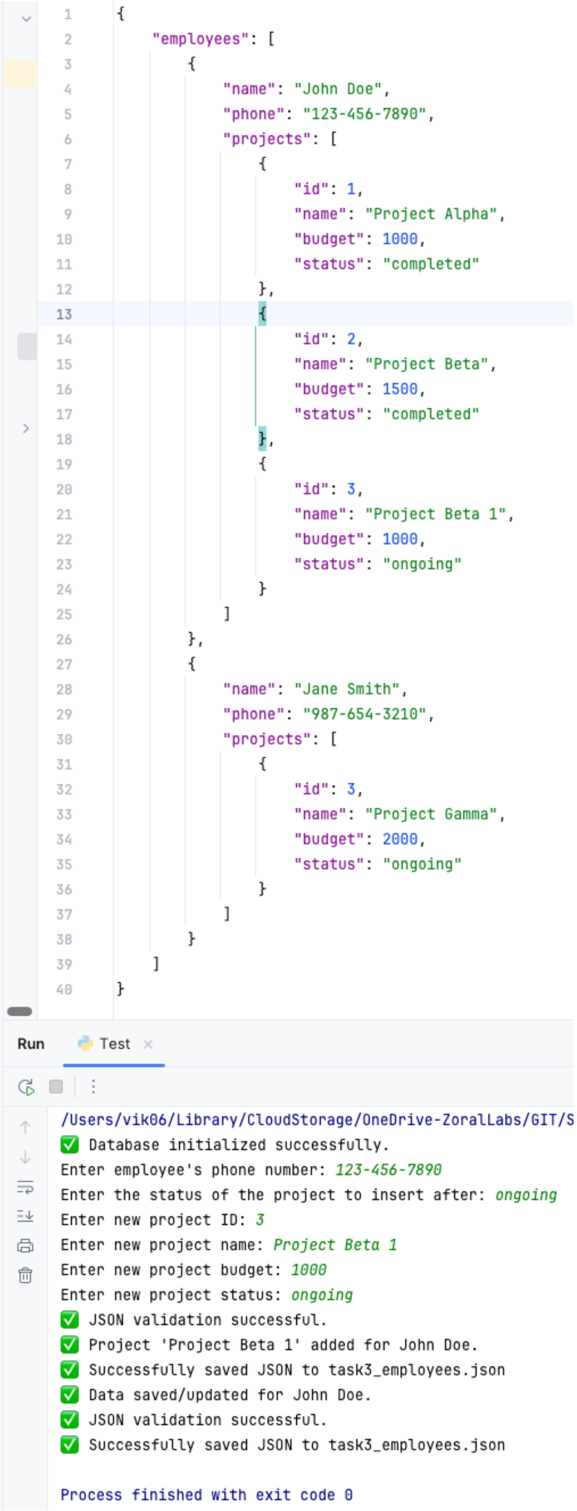
```
select * from employees;
```



```
 id |    name    |    phone     |    serviceetltimestamp
----+------------+--------------+----------------------------
  1 | John Doe   | 123-456-7890 | 2025-03-24 19:38:01.496297
  2 | Jane Smith | 987-654-3210 | 2025-03-24 19:38:01.613066
(2 rows)
```

Step 3. Run Python validate_json.py to add new project Project Beta 1 from user prompts in employees.json and in projects SCD2 table for employee 123-456-7890.

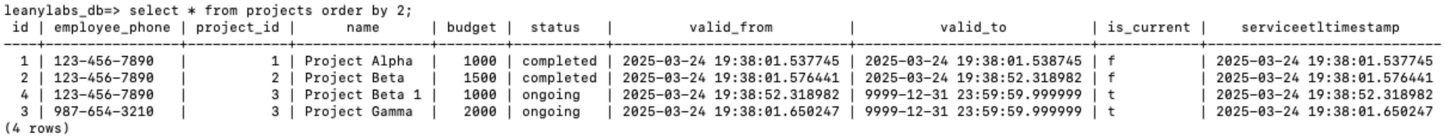
The Project Beta 1 has been successfully added to the end for employee with phone 123-456-7890.



```
{
    "employees": [
        {
            "name": "John Doe",
            "phone": "123-456-7890",
            "projects": [
                {
                    "id": 1,
                    "name": "Project Alpha",
                    "budget": 1000,
                    "status": "completed"
                },
                {
                    "id": 2,
                    "name": "Project Beta",
                    "budget": 1500,
                    "status": "completed"
                },
                {
                    "id": 3,
                    "name": "Project Beta 1",
                    "budget": 1000,
                    "status": "ongoing"
                }
            ]
        },
        {
            "name": "Jane Smith",
            "phone": "987-654-3210",
            "projects": [
                {
                    "id": 3,
                    "name": "Project Gamma",
                    "budget": 2000,
                    "status": "ongoing"
                }
            ]
        }
    ]
}
```

```
/Users/vik06/Library/CloudStorage/OneDrive-ZoralLabs/GIT/S
✅ Database initialized successfully.
Enter employee's phone number: 123-456-7890
Enter the status of the project to insert after: ongoing
Enter new project ID: 3
Enter new project name: Project Beta 1
Enter new project budget: 1000
Enter new project status: ongoing
✅ JSON validation successful.
✅ Project 'Project Beta 1' added for John Doe.
✅ Successfully saved JSON to task3_employees.json
✅ Data saved/updated for John Doe.
✅ JSON validation successful.
✅ Successfully saved JSON to task3_employees.json

Process finished with exit code 0
```

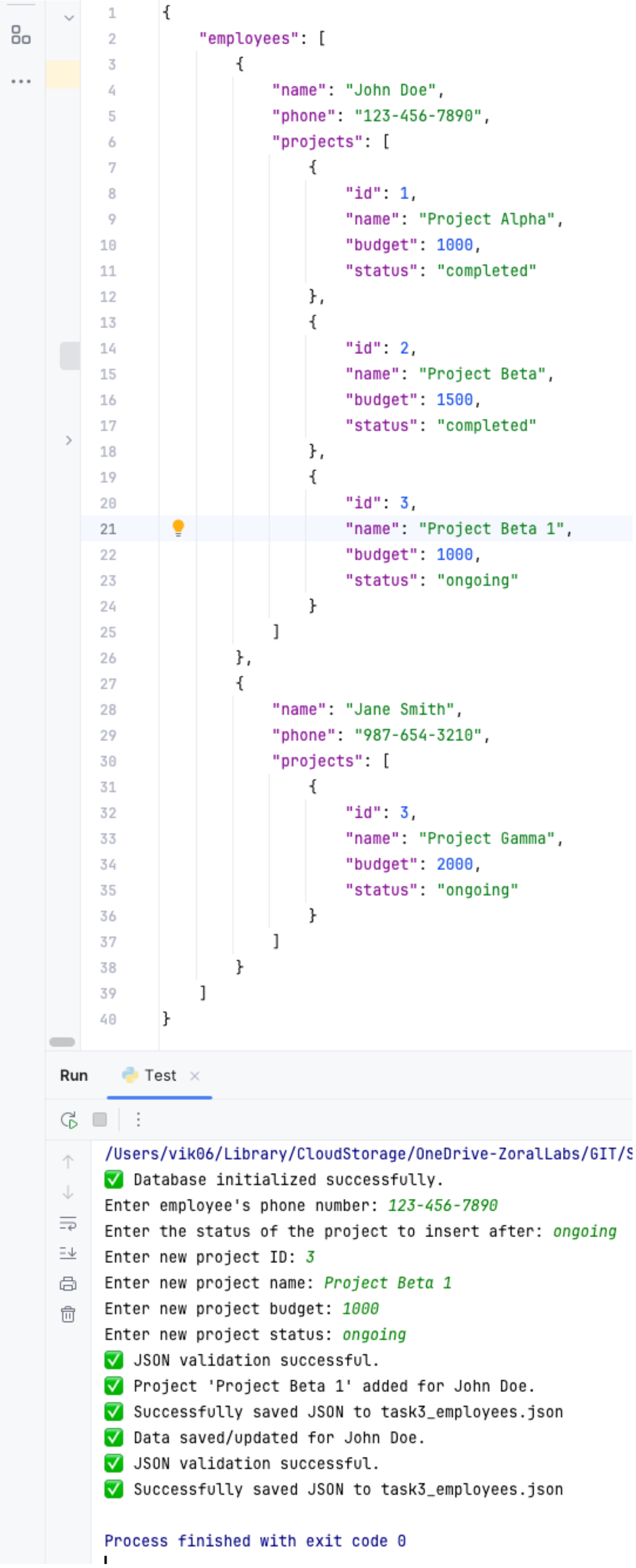
Verify the data in the table projects. For previous rows of employee 123-456-7890 the statuses set to completed, valid_to closed, is_current – False. Only the latest row is active, all history are stored.



```
leanylabs_db=> select * from projects order by 2;
 id | employee_phone | project_id |      name      | budget |  status   |         valid_from         |          valid_to          | is_current |    serviceetltimestamp
----+----------------+------------+----------------+--------+-----------+----------------------------+----------------------------+------------+----------------------------
  1 | 123-456-7890   |          1 | Project Alpha  |   1000 | completed | 2025-03-24 19:38:01.537745 | 2025-03-24 19:38:01.538745 | f          | 2025-03-24 19:38:01.537745
  2 | 123-456-7890   |          2 | Project Beta   |   1500 | completed | 2025-03-24 19:38:01.576441 | 2025-03-24 19:38:52.318982 | f          | 2025-03-24 19:38:01.576441
  4 | 123-456-7890   |          3 | Project Beta 1 |   1000 | ongoing   | 2025-03-24 19:38:52.318982 | 9999-12-31 23:59:59.999999 | t          | 2025-03-24 19:38:52.318982
  3 | 987-654-3210   |          3 | Project Gamma  |   2000 | ongoing   | 2025-03-24 19:38:01.650247 | 9999-12-31 23:59:59.999999 | t          | 2025-03-24 19:38:01.650247
(4 rows)
```

Step 3. Run Python validate_json.py to add the same project Project Beta 1 from user prompts in employees.json and in projects SCD2 table for employee 123-456-7890.

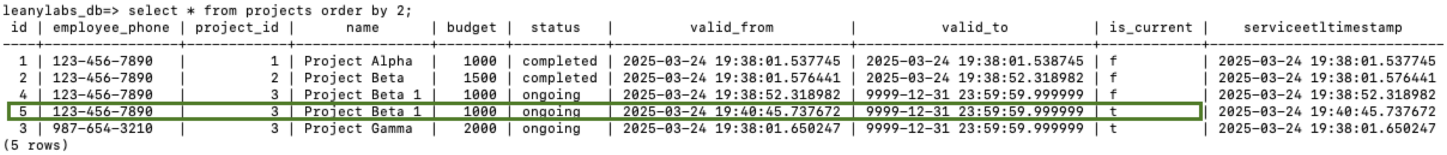
Nothing changed, we didn’t insert the duplicate to employees.json.



```json
{
    "employees": [
        {
            "name": "John Doe",
            "phone": "123-456-7890",
            "projects": [
                {
                    "id": 1,
                    "name": "Project Alpha",
                    "budget": 1000,
                    "status": "completed"
                },
                {
                    "id": 2,
                    "name": "Project Beta",
                    "budget": 1500,
                    "status": "completed"
                },
                {
                    "id": 3,
                    "name": "Project Beta 1",
                    "budget": 1000,
                    "status": "ongoing"
                }
            ]
        },
        {
            "name": "Jane Smith",
            "phone": "987-654-3210",
            "projects": [
                {
                    "id": 3,
                    "name": "Project Gamma",
                    "budget": 2000,
                    "status": "ongoing"
                }
            ]
        }
    ]
}
```

```
/Users/vik06/Library/CloudStorage/OneDrive-ZoralLabs/GIT/S
✅ Database initialized successfully.
Enter employee's phone number: 123-456-7890
Enter the status of the project to insert after: ongoing
Enter new project ID: 3
Enter new project name: Project Beta 1
Enter new project budget: 1000
Enter new project status: ongoing
✅ JSON validation successful.
✅ Project 'Project Beta 1' added for John Doe.
✅ Successfully saved JSON to task3_employees.json
✅ Data saved/updated for John Doe.
✅ JSON validation successful.
✅ Successfully saved JSON to task3_employees.json

Process finished with exit code 0
```

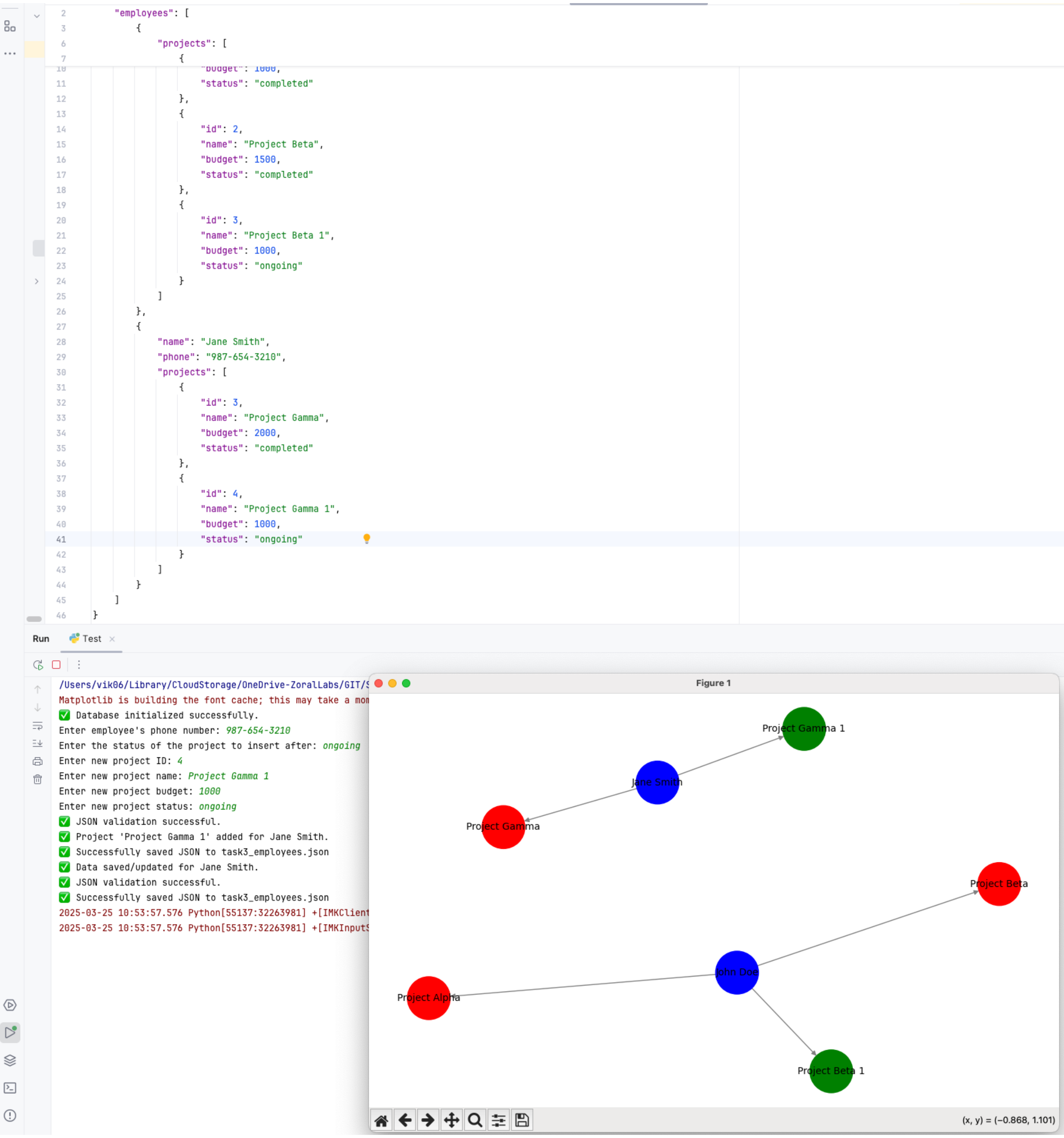
Verify the data in the table projects. Only the latest row is active with flag is_active – True, all history are stored.



```
leanylabs_db=> select * from projects order by 2;
 id | employee_phone | project_id |      name      | budget |  status   |         valid_from         |          valid_to          | is_current |    serviceetltimestamp
----+----------------+------------+----------------+--------+-----------+----------------------------+----------------------------+------------+----------------------------
  1 | 123-456-7890   |          1 | Project Alpha  |   1000 | completed | 2025-03-24 19:38:01.537745 | 2025-03-24 19:38:01.538745 | f          | 2025-03-24 19:38:01.537745
  2 | 123-456-7890   |          2 | Project Beta   |   1500 | completed | 2025-03-24 19:38:01.576441 | 2025-03-24 19:38:52.318982 | f          | 2025-03-24 19:38:01.576441
  4 | 123-456-7890   |          3 | Project Beta 1 |   1000 | ongoing   | 2025-03-24 19:38:52.318982 | 9999-12-31 23:59:59.999999 | f          | 2025-03-24 19:38:52.318982
  5 | 123-456-7890   |          3 | Project Beta 1 |   1000 | ongoing   | 2025-03-24 19:40:45.737672 | 9999-12-31 23:59:59.999999 | t          | 2025-03-24 19:40:45.737672
  3 | 987-654-3210   |          3 | Project Gamma  |   2000 | ongoing   | 2025-03-24 19:38:01.650247 | 9999-12-31 23:59:59.999999 | t          | 2025-03-24 19:38:01.650247
(5 rows)
```

Step 4. Run Python validate_json.py to add the project Project Gamma 1 from user prompts in employees.json and in projects SCD2 table for employee 987-654-3210 with visualization.

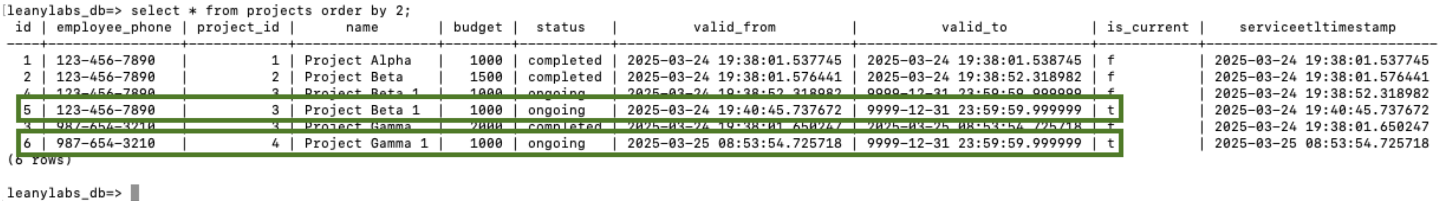
The new Project Gamma 1 has been added to employees.json, the previous Project Gamma automatically was set to completed.



```
    "employees": [
        {
            "projects": [
                {
                    "budget": 1000,
                    "status": "completed"
                },
                {
                    "id": 2,
                    "name": "Project Beta",
                    "budget": 1500,
                    "status": "completed"
                },
                {
                    "id": 3,
                    "name": "Project Beta 1",
                    "budget": 1000,
                    "status": "ongoing"
                }
            ]
        },
        {
            "name": "Jane Smith",
            "phone": "987-654-3210",
            "projects": [
                {
                    "id": 3,
                    "name": "Project Gamma",
                    "budget": 2000,
                    "status": "completed"
                },
                {
                    "id": 4,
                    "name": "Project Gamma 1",
                    "budget": 1000,
                    "status": "ongoing"
                }
            ]
        }
    ]
}
```

```
/Users/vik06/Library/CloudStorage/OneDrive-ZoralLabs/GIT/S
Matplotlib is building the font cache; this may take a mon
✅ Database initialized successfully.
Enter employee's phone number: 987-654-3210
Enter the status of the project to insert after: ongoing
Enter new project ID: 4
Enter new project name: Project Gamma 1
Enter new project budget: 1000
Enter new project status: ongoing
✅ JSON validation successful.
✅ Project 'Project Gamma 1' added for Jane Smith.
✅ Successfully saved JSON to task3_employees.json
✅ Data saved/updated for Jane Smith.
✅ JSON validation successful.
✅ Successfully saved JSON to task3_employees.json
2025-03-25 10:53:57.576 Python[55137:32263981] +[IMKClient
2025-03-25 10:53:57.576 Python[55137:32263981] +[IMKInputS
```

Verify the data in the table projects. Only the latest rows for both employees are active with flag is_active – True, all history are stored.



```
leanylabs_db=> select * from projects order by 2;
 id | employee_phone | project_id |       name       | budget |  status   |         valid_from         |          valid_to          | is_current |    serviceetltimestamp
----+----------------+------------+------------------+--------+-----------+----------------------------+----------------------------+------------+----------------------------
  1 | 123-456-7890   |          1 | Project Alpha    |   1000 | completed | 2025-03-24 19:38:01.537745 | 2025-03-24 19:38:01.538745 | f          | 2025-03-24 19:38:01.537745
  2 | 123-456-7890   |          2 | Project Beta     |   1500 | completed | 2025-03-24 19:38:01.576441 | 2025-03-24 19:38:52.318982 | f          | 2025-03-24 19:38:01.576441
  4 | 123-456-7890   |          3 | Project Beta 1   |   1000 | ongoing   | 2025-03-24 19:38:52.318982 | 9999-12-31 23:59:59.999999 | f          | 2025-03-24 19:38:52.318982
  5 | 123-456-7890   |          3 | Project Beta 1   |   1000 | ongoing   | 2025-03-24 19:40:45.737672 | 9999-12-31 23:59:59.999999 | t          | 2025-03-24 19:40:45.737672
  3 | 987-654-3210   |          3 | Project Gamma    |   2000 | completed | 2025-03-24 19:38:01.650247 | 2025-03-25 08:53:54.725718 | f          | 2025-03-24 19:38:01.650247
  6 | 987-654-3210   |          4 | Project Gamma 1  |   1000 | ongoing   | 2025-03-25 08:53:54.725718 | 9999-12-31 23:59:59.999999 | t          | 2025-03-25 08:53:54.725718
(6 rows)

leanylabs_db=>
```

Thank you, folks ☺