Основы синтаксиса SQL

Адаптировано из:
Charles Severance
Python for Everybody
https://www.py4e.com/lessons/database

Распространенные системы управления базами данных (СУБД)

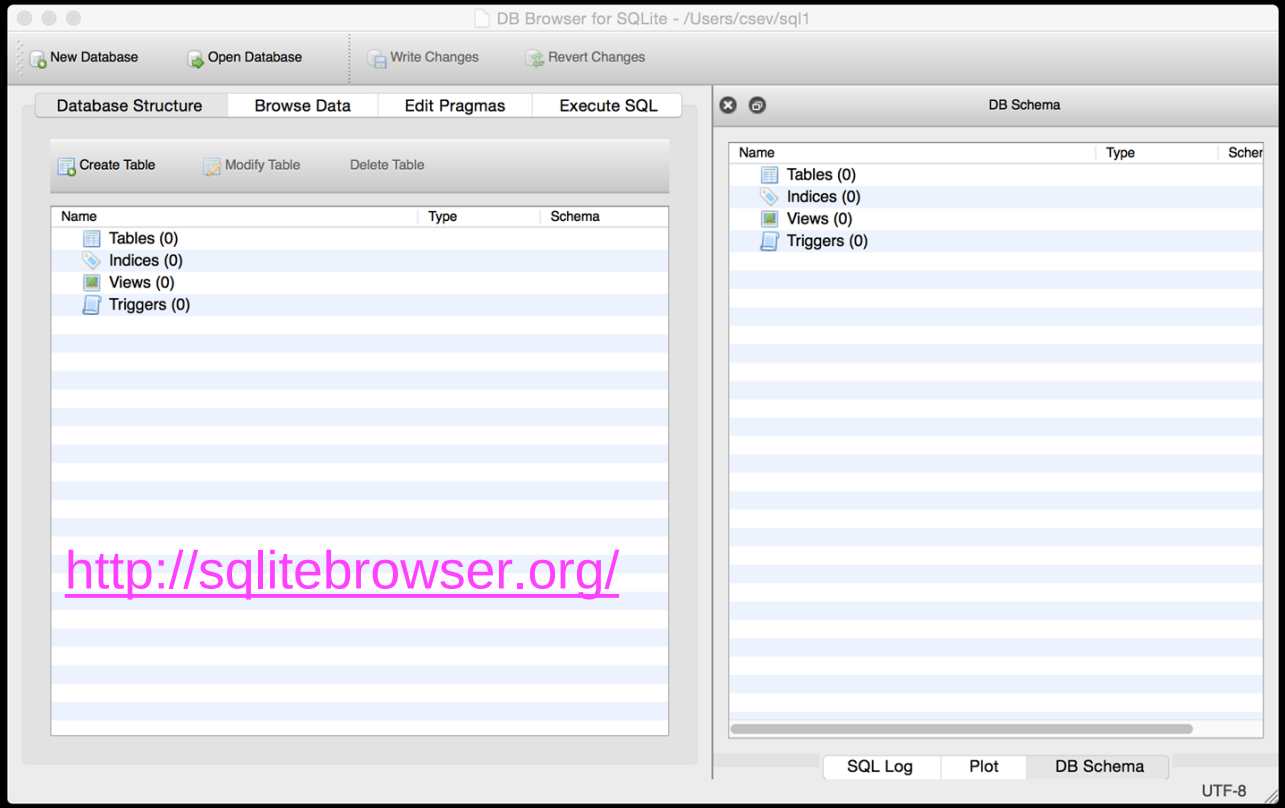
- Наиболее широко используются:
  - Oracle – Большая, платная, промышленного масштаба, множество тонких настроек
  - MySql – Попроще, но очень быстрая и масштабируемая - коммерческий open source
  - SqlServer – Очень удобная – разработка Microsoft (также Access)
- Множество других проектов поменьше, бесплатных и open source
  - HSQL, SQLite, Postgres, ...

SQLite используется во многих программных продуктах...

http://www.sqlite.org/famous.html

Графический интерфейс для SQLite

- SQLite – это весьма популярная СУБД. Она бесплатная, отличается быстродействием и компактностью.
- Графический интерфейс для SQLite позволяет напрямую выполнять операции с базой данных.
  - http://sqlitebrowser.org/
- SQLite интегрирована в Python и ряд других языков.


DB Browser for SQLite - /Users/csev/sql1
New Database
Open Database
Write Changes
Revert Changes
Database Structure
Browse Data
Edit Pragmas
Execute SQL
Create Table
Modify Table
Delete Table
Name
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Tables (0)
Indices (0)
Views (0)
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http://sqlitebrowser.org/
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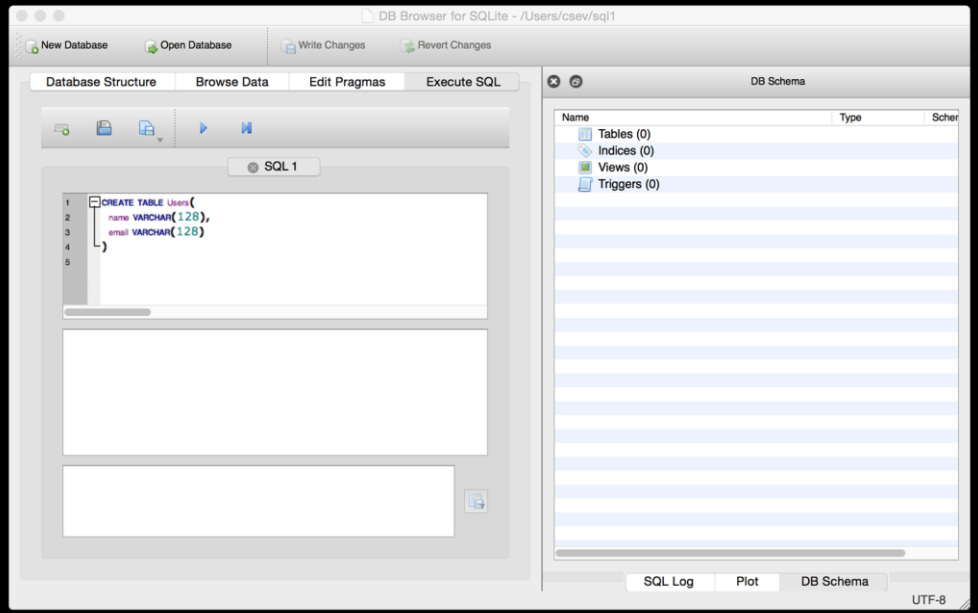
Tables (0)
Indices (0)
Views (0)
Triggers (0)
SQL Log
Plot
DB Schema
UTF-8

Создаем базу данных

https://www.py4e.com/lectures3/Pythonlearn-15-Database-Handout.txt

Начинаем с азов – всего одна таблица



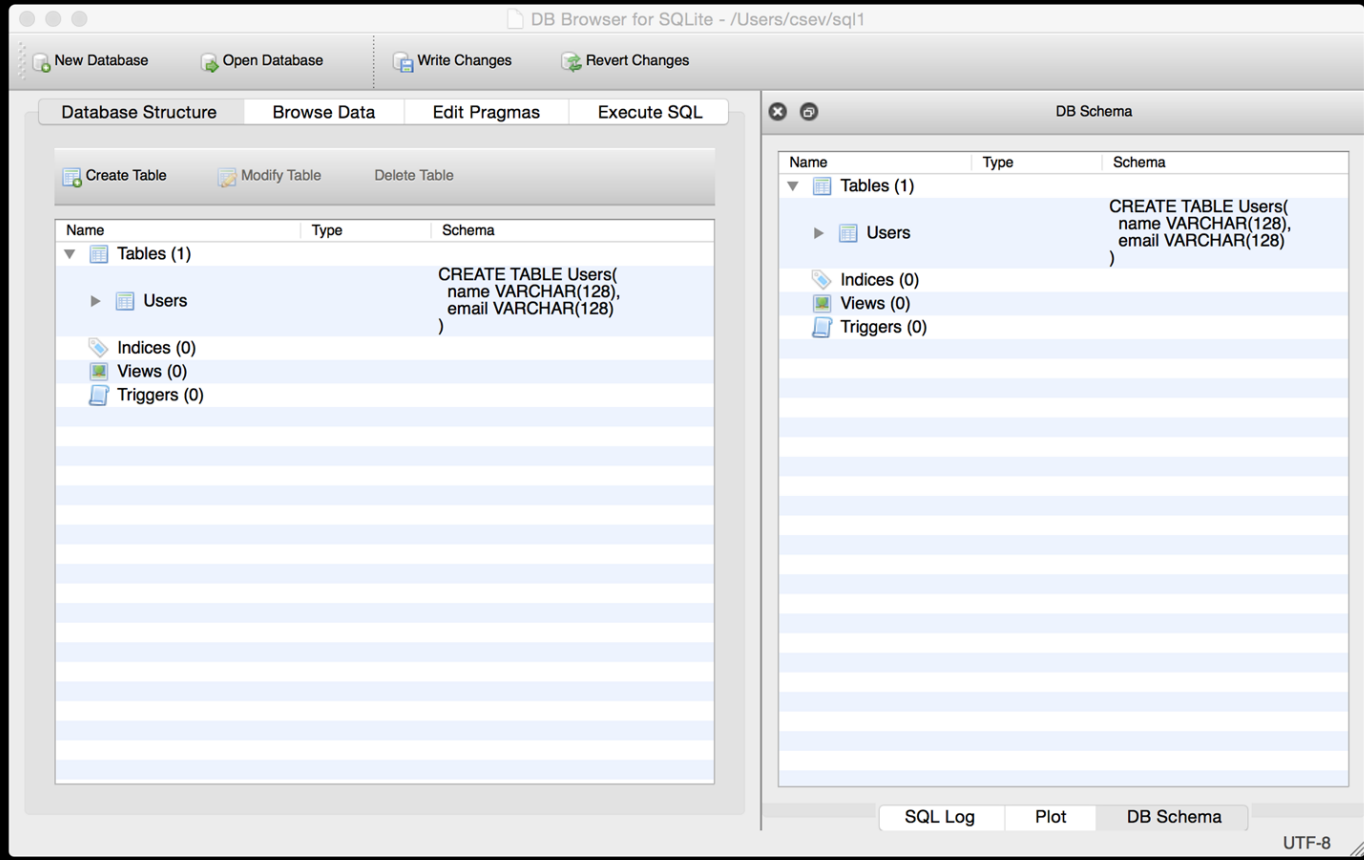

```
CREATE TABLE Users(
  name VARCHAR(128),
  email VARCHAR(128)
);

INSERT INTO Users (name, email)
VALUES ('Chuck', 'csev@umich.edu');

INSERT INTO Users (name, email)
VALUES ('Colleen', 'cvl@umich.edu');

INSERT INTO Users (name, email)
VALUES ('Ted', 'ted@umich.edu');

INSERT INTO Users (name, email)
VALUES ('Sally', 'a1@umich.edu');
```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Tables (1)
Users
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Indices (0)
Views (0)
Triggers (0)
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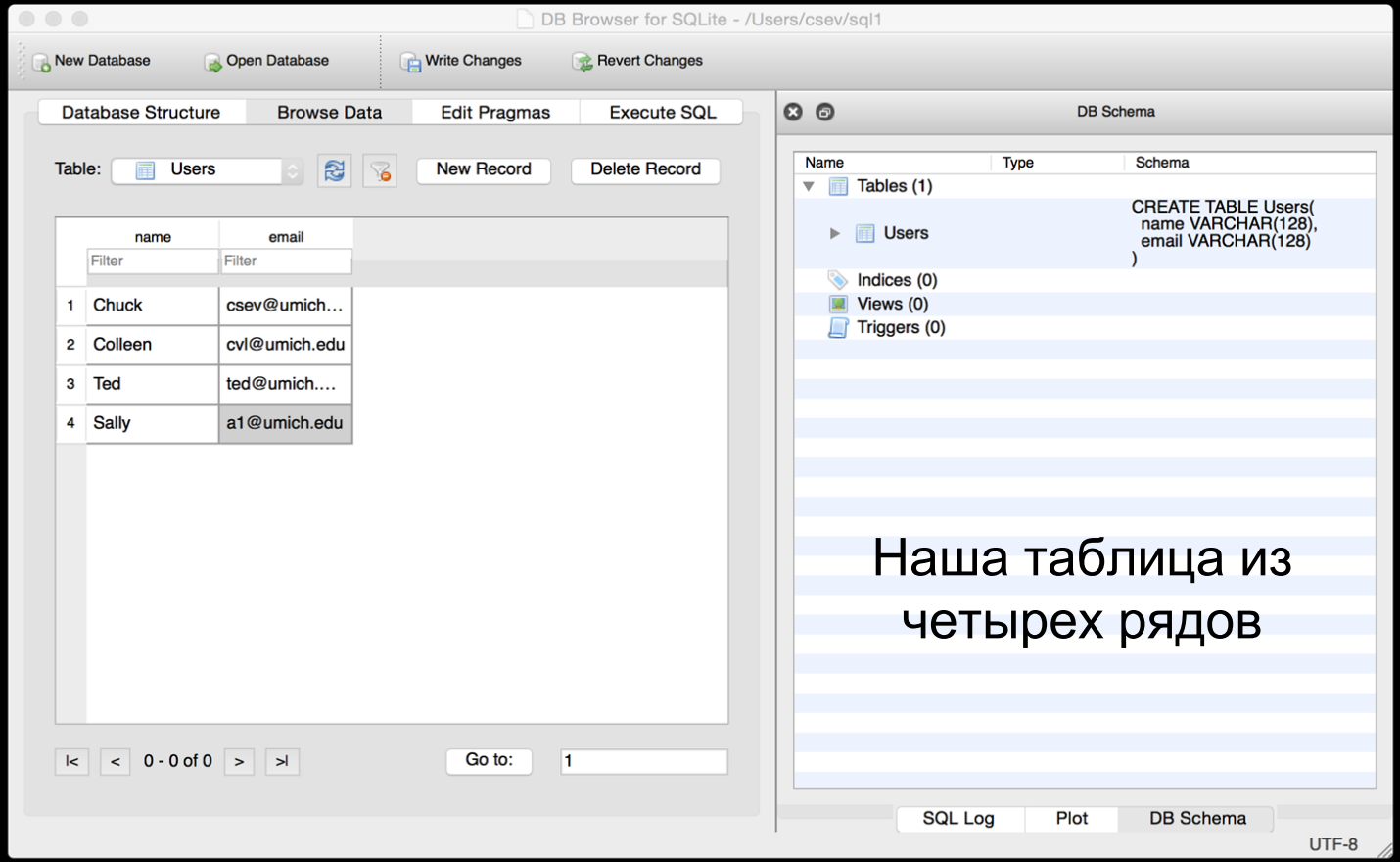
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New Database
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Database Structure
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Execute SQL
Table: Users
New Record
Delete Record
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1 Chuck csev@umich...
2 Colleen cvl@umich.edu
3 Ted ted@umich....
4 Sally a1@umich.edu
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Schema
Tables (1)
Users
CREATE TABLE Users(
name VARCHAR(128),
email VARCHAR(128)
)
Indices (0)
Views (0)
Triggers (0)
Наша таблица из четырех рядов
SQL Log
Plot
DB Schema
UTF-8

SQL

Structured Query Language (язык структурированных запросов) – используется для передачи команд в базу данных

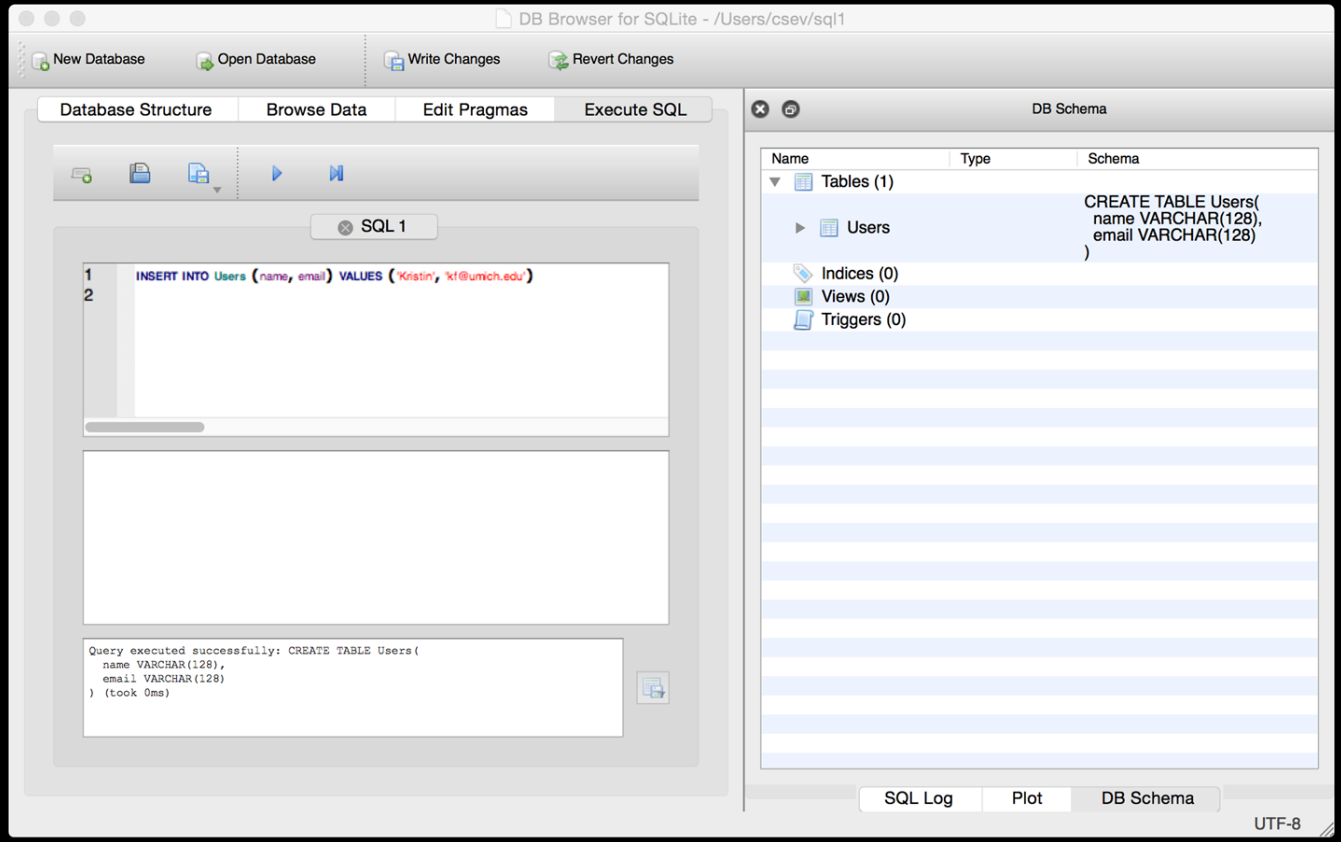
- Создание записей (иначе говоря – вставка, или Insert)
- Получение данных
- Изменение данных
- Удаление данных

http://en.wikipedia.org/wiki/SQL

SQL: Insert

Инструкция INSERT – служит для добавления ряда в таблицу:

```
INSERT INTO Users (name, email) VALUES ('Kristin', 'kf@umich.edu');
```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Open Database
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Revert Changes
Database Structure
Browse Data
Edit Pragmas
Execute SQL
SQL 1
1 INSERT INTO Users (name, email) VALUES ('Kristin', 'kf@umich.edu')
2
Query executed successfully: CREATE TABLE Users(
name VARCHAR(128),
email VARCHAR(128)
) (took 0ms)
DB Schema
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Schema
Tables (1)
Users
CREATE TABLE Users(
name VARCHAR(128),
email VARCHAR(128)
)
Indices (0)
Views (0)
Triggers (0)
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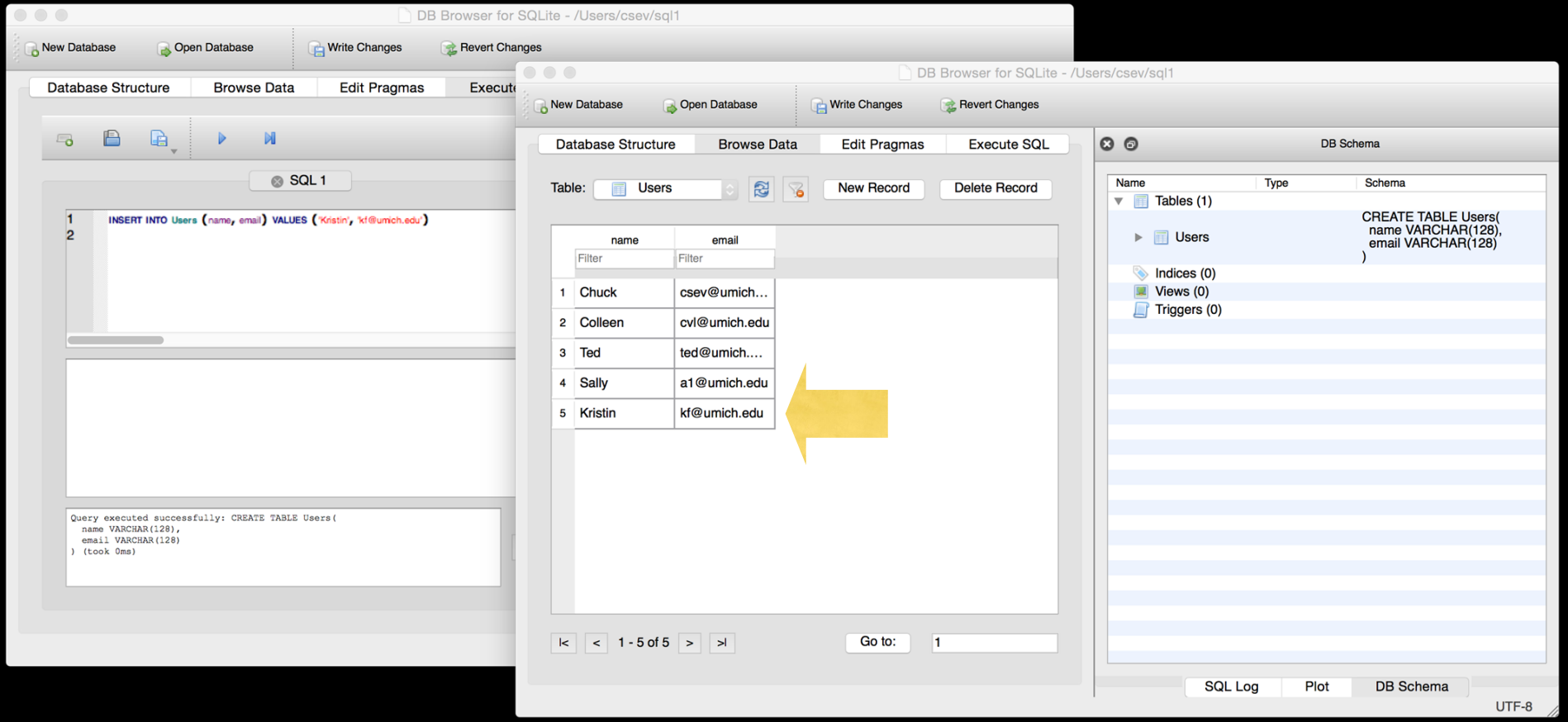
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New Record
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name
email
Filter
Filter
1 Chuck csev@umich...
2 Colleen cvl@umich.edu
3 Ted ted@umich....
4 Sally a1@umich.edu
5 Kristin kf@umich.edu
|< < 1 - 5 of 5 > >|
Go to: 1
DB Schema
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CREATE TABLE Users(
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)
Indices (0)
Views (0)
Triggers (0)
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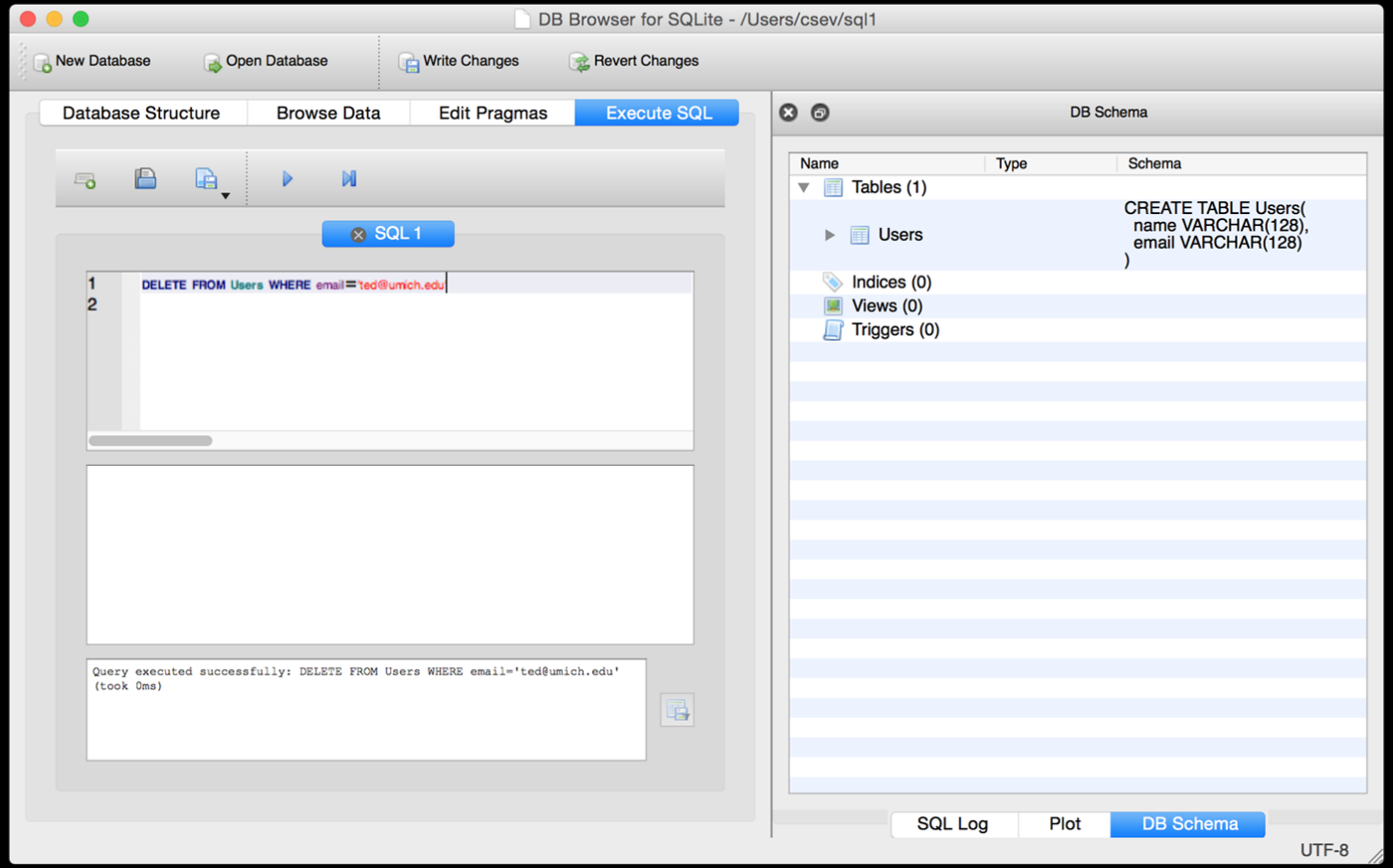
UTF-8

SQL: Delete

Удаляет один или несколько рядов из таблицы с учетом критериев выбора:

```
DELETE FROM Users WHERE email='ted@umich.edu';
```


DB Browser for SQLite - /Users/csev/sql1
New Database
Open Database
Write Changes
Revert Changes
Database Structure
Browse Data
Edit Pragmas
Execute SQL
SQL 1
1 DELETE FROM Users WHERE email='ted@umich.edu'
2
Query executed successfully: DELETE FROM Users WHERE email='ted@umich.edu' (took 0ms)
DB Schema
Name
Type
Schema
Tables (1)
Users
CREATE TABLE Users(name VARCHAR(128), email VARCHAR(128))
Indices (0)
Views (0)
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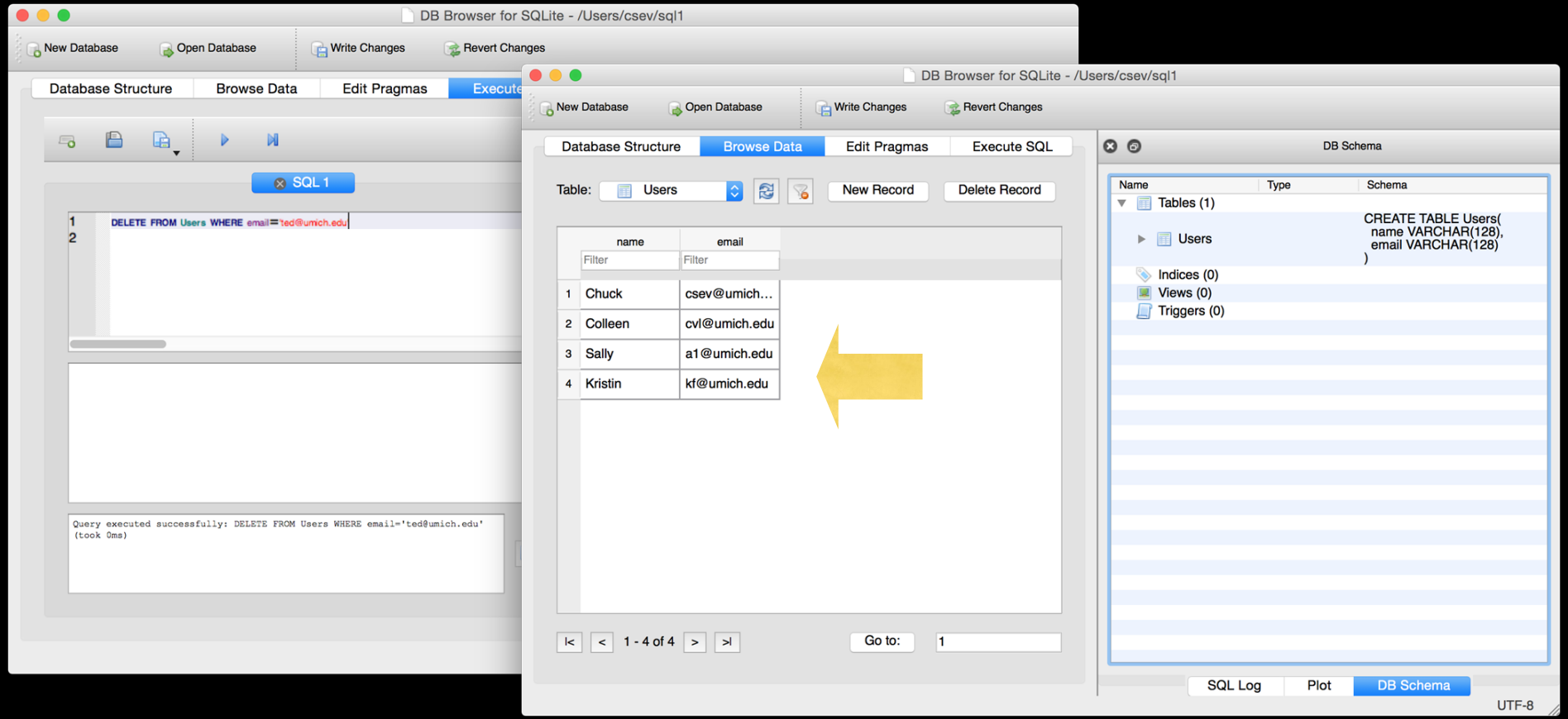
DB Browser for SQLite - /Users/csev/sql1
New Database
Open Database
Write Changes
Revert Changes
Database Structure
Browse Data
Edit Pragmas
Execute SQL
SQL 1
1 DELETE FROM Users WHERE email='ted@umich.edu'
2
Query executed successfully: DELETE FROM Users WHERE email='ted@umich.edu' (took 0ms)
DB Browser for SQLite - /Users/csev/sql1
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|< < 1 - 4 of 4 > >|
Go to: 1
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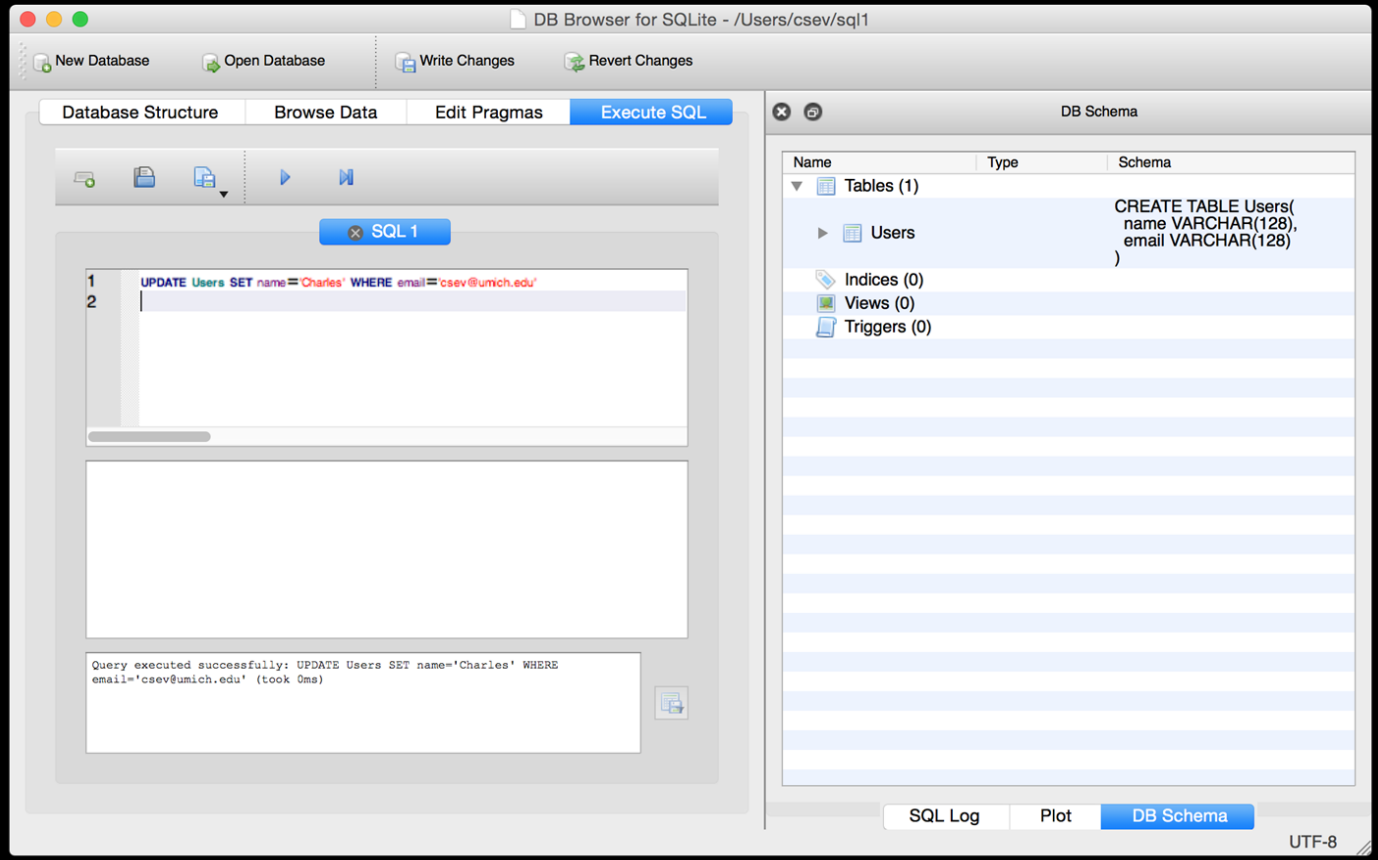
SQL: Update

Позволяет обновить (изменить) значение поля с использованием условия `where`

** без `where` новое значение будет присвоено указанному полю во всех рядах таблицы*

```
UPDATE Users SET name='Charles' WHERE
email='csev@umich.edu';
```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Execute SQL
SQL 1
1 UPDATE Users SET name='Charles' WHERE email='csev@umich.edu'
2
Query executed successfully: UPDATE Users SET name='Charles' WHERE email='csev@umich.edu' (took 0ms)
DB Schema
Name
Type
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CREATE TABLE Users(name VARCHAR(128), email VARCHAR(128))
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Views (0)
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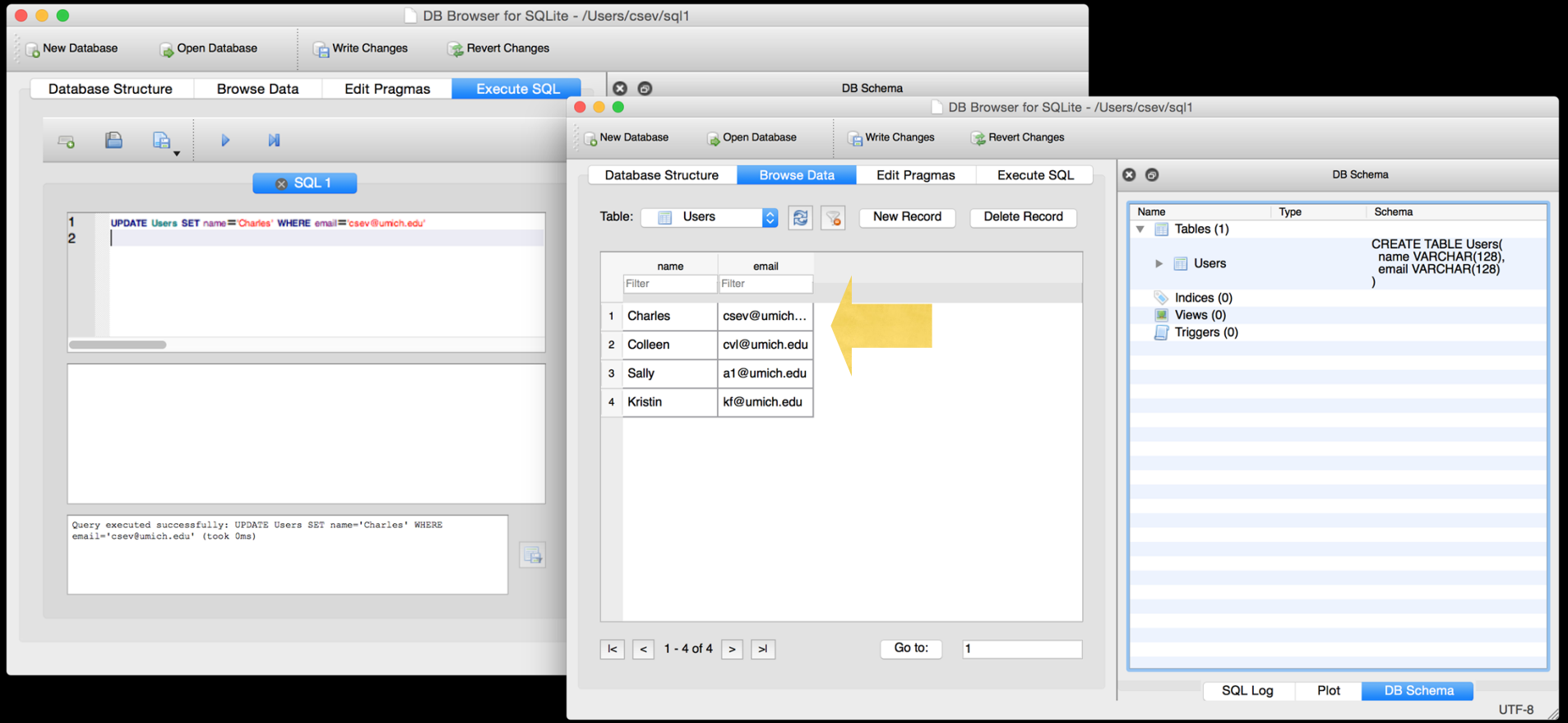
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Query executed successfully: UPDATE Users SET name='Charles' WHERE email='csev@umich.edu' (took 0ms)
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Получение записей: SELECT

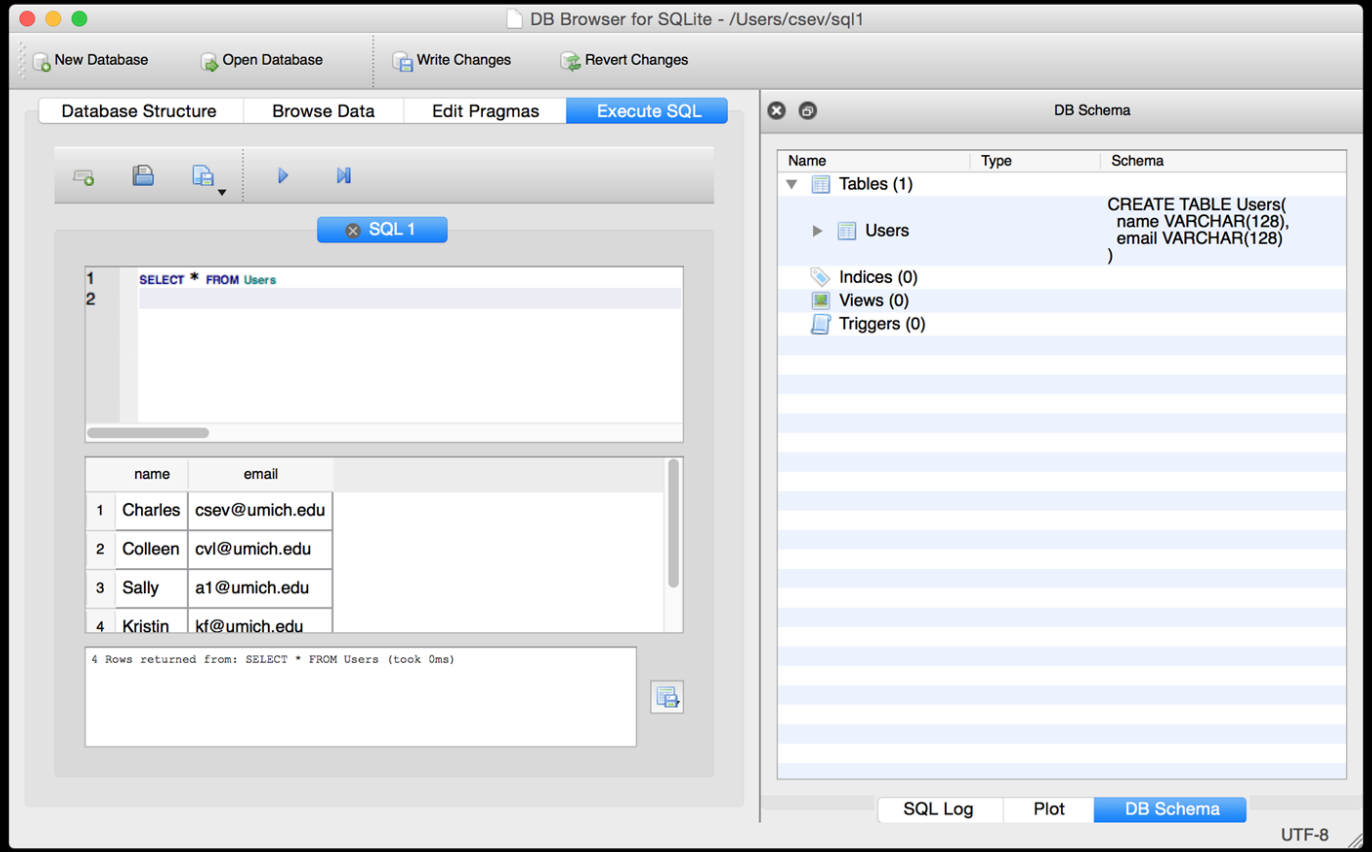
Инструкция SELECT используется для получения набора записей из таблицы

– всех :

```
SELECT * FROM Users;
```

– или некоторого подмножества по условию WHERE:

```
SELECT * FROM Users WHERE email='csev@umich.edu';
```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New Database
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Database Structure
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Execute SQL
SQL 1
1 SELECT * FROM Users
2
name email
1 Charles csev@umich.edu
2 Colleen cvl@umich.edu
3 Sally a1@umich.edu
4 Kristin kf@umich.edu
4 Rows returned from: SELECT * FROM Users (took 0ms)
DB Schema
Name Type Schema
Tables (1)
Users
CREATE TABLE Users(
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)
Indices (0)
Views (0)
Triggers (0)
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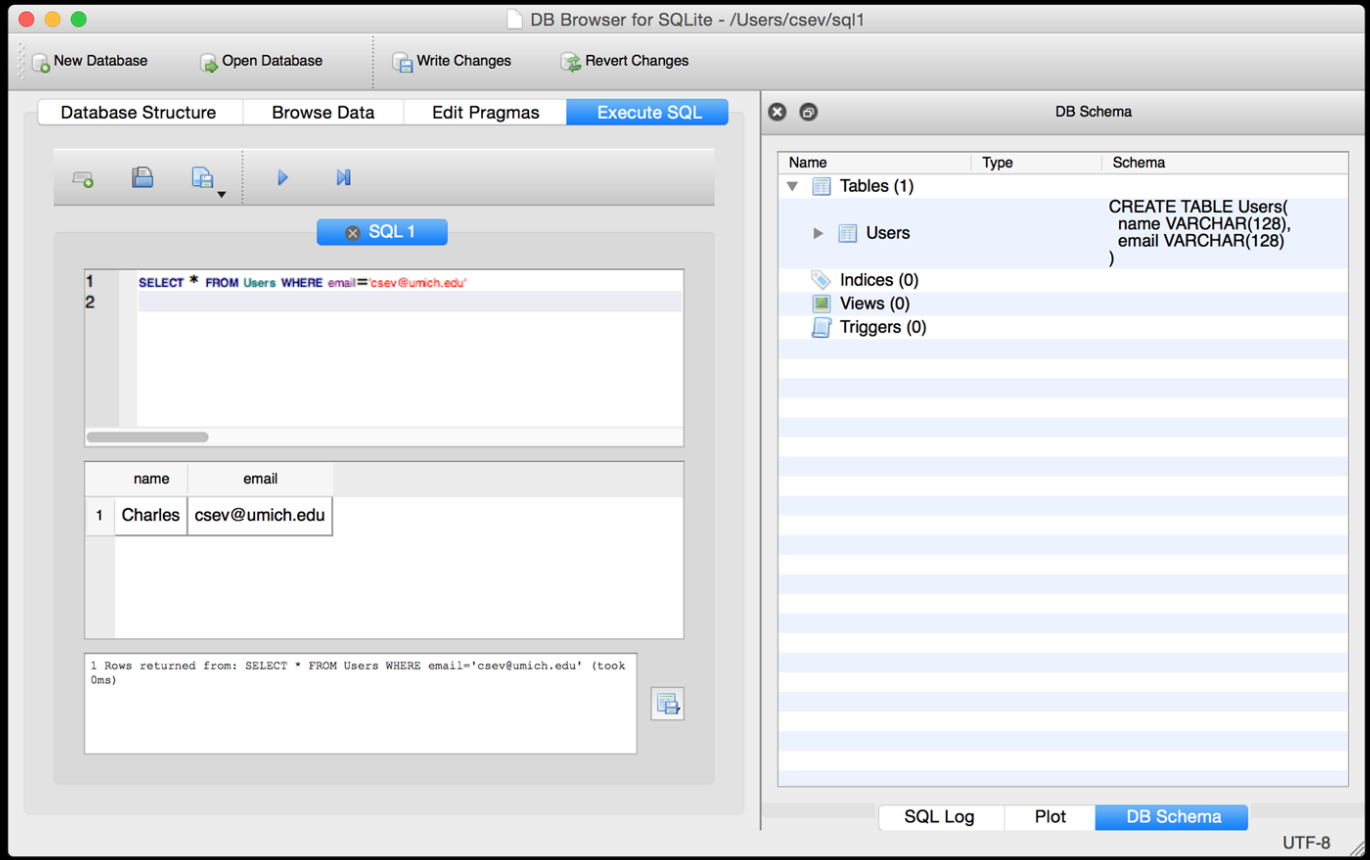
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1 SELECT * FROM Users WHERE email='csev@umich.edu'
2
name
email
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Charles
csev@umich.edu
1 Rows returned from: SELECT * FROM Users WHERE email='csev@umich.edu' (took 0ms)
DB Schema
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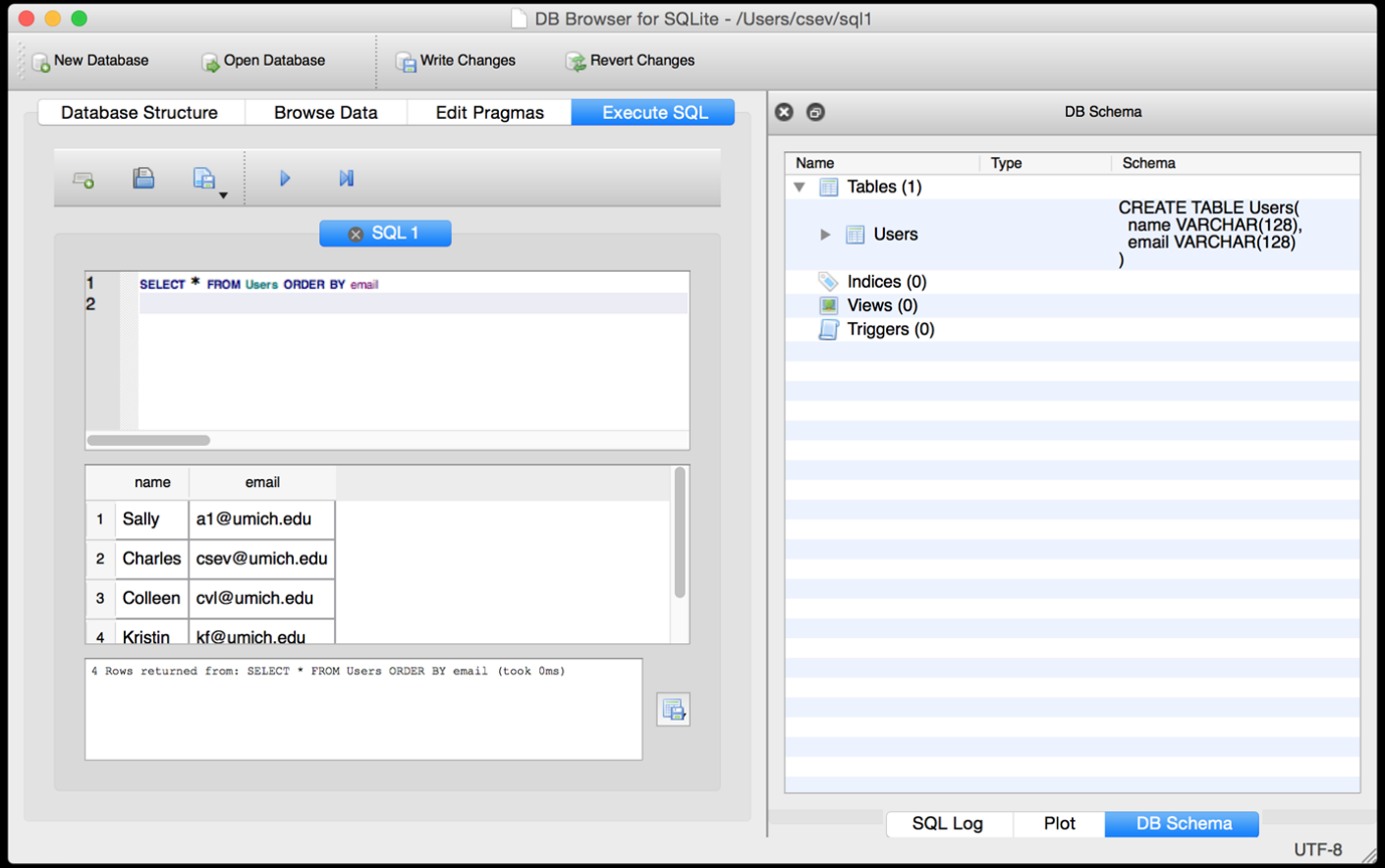
Сортировка с помощью ORDER BY

Конструкция ORDER BY может включаться в SELECT-инструкции для вывода результатов с сортировкой по возрастанию (`ASC`, по умолчанию) или по убыванию (`DESC`)

```
SELECT * FROM Users ORDER BY email;

SELECT * FROM Users ORDER BY name DESC;
```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2
name email
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Базовый синтаксис SQL

```
INSERT INTO Users (name, email) VALUES ('Kristin', 'kf@umich.edu');

DELETE FROM Users WHERE email='ted@umich.edu';

UPDATE Users SET name="Charles" WHERE email='csev@umich.edu';

SELECT * FROM Users;

SELECT * FROM Users WHERE email='csev@umich.edu';

SELECT * FROM Users ORDER BY email;
```

Acknowledgements / Contributions

Initial Development: Charles Severance, University of Michigan School of Information

Перевод с английского, адаптация:
Максим Мислављский out of nowhere

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