Database

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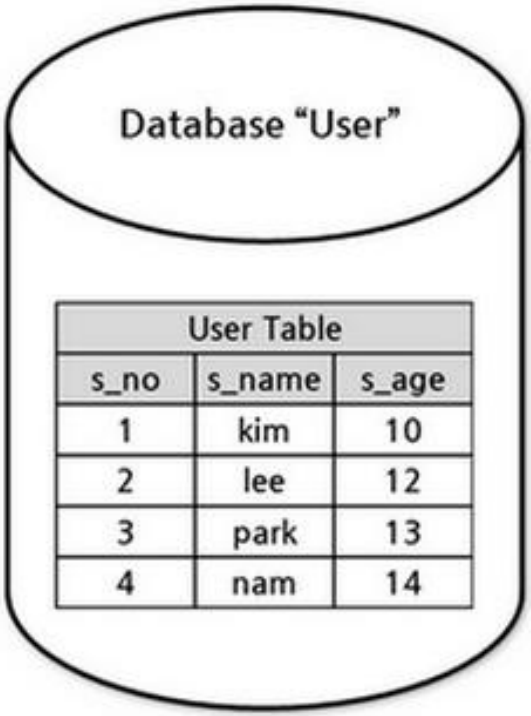
Outline

- Database

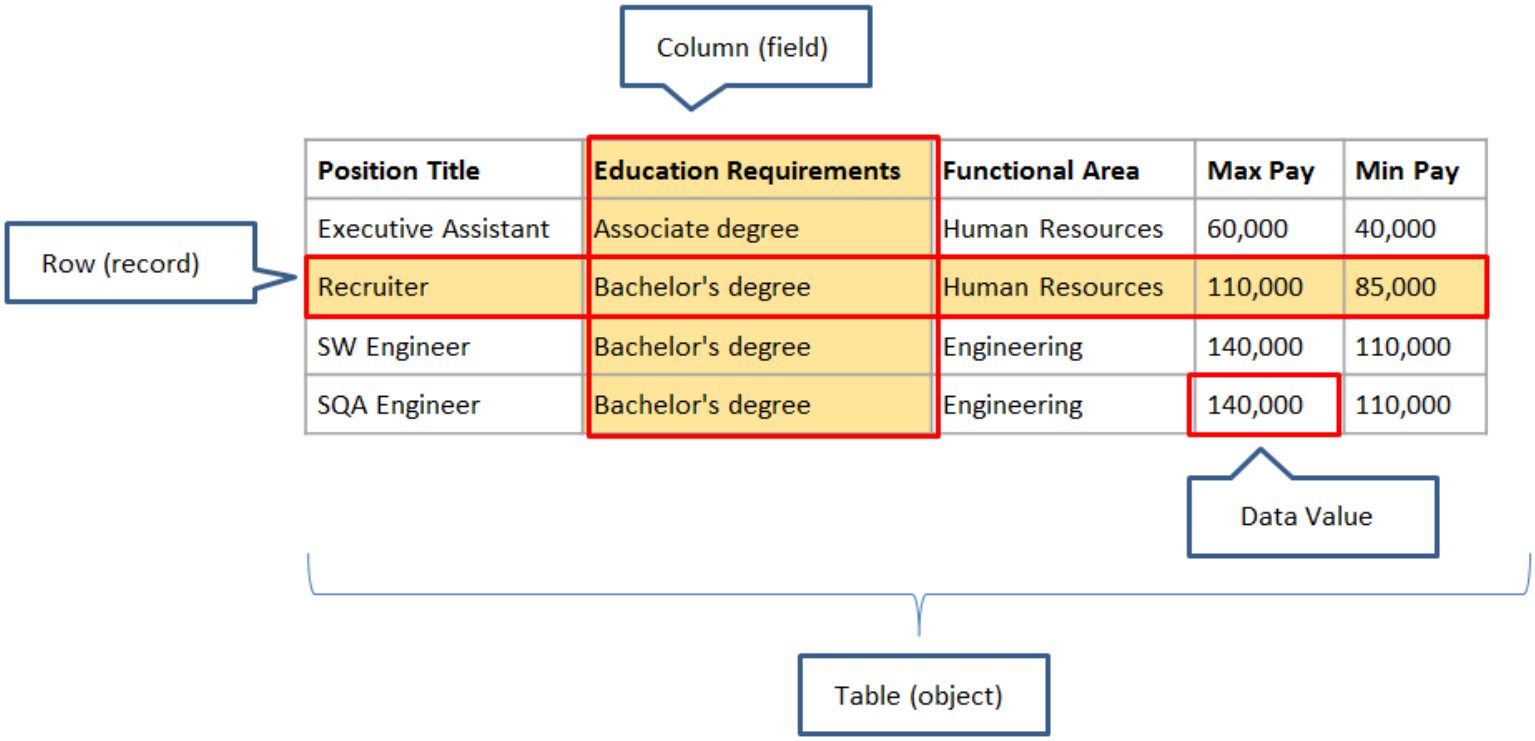
Database

Database

- Database stores many table
- Each table stores data



Database terminology



Database

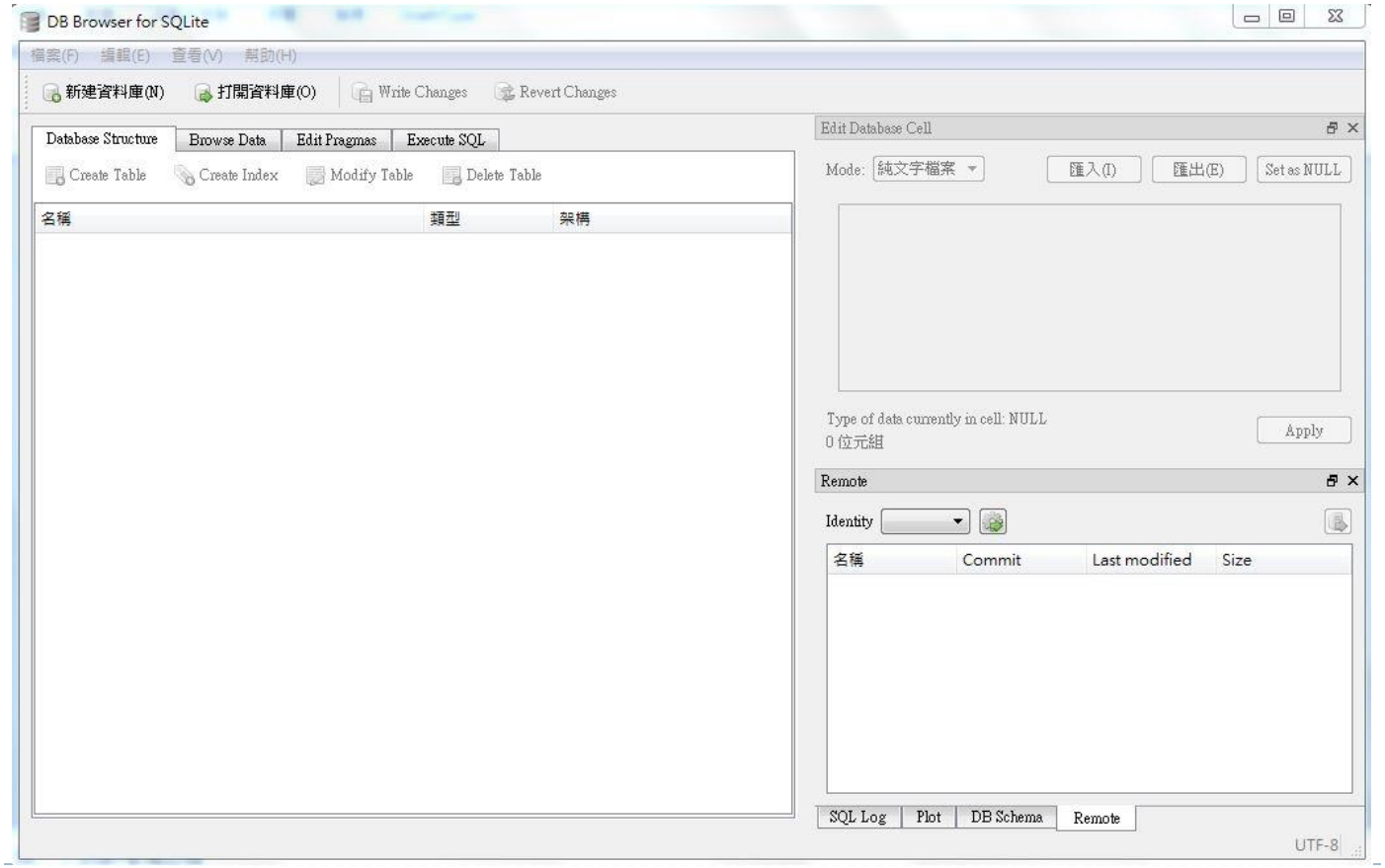
- Database API in Python
  - DB-API(PEP 249) describe specification to provide Database access for Python application.
  - Ex: MySQL, Oracle, SQLite…
  - Interact diagram:

SQLite

- Relational database management system
- Embedded database software for local/client storage
- Use SQL to manipulate

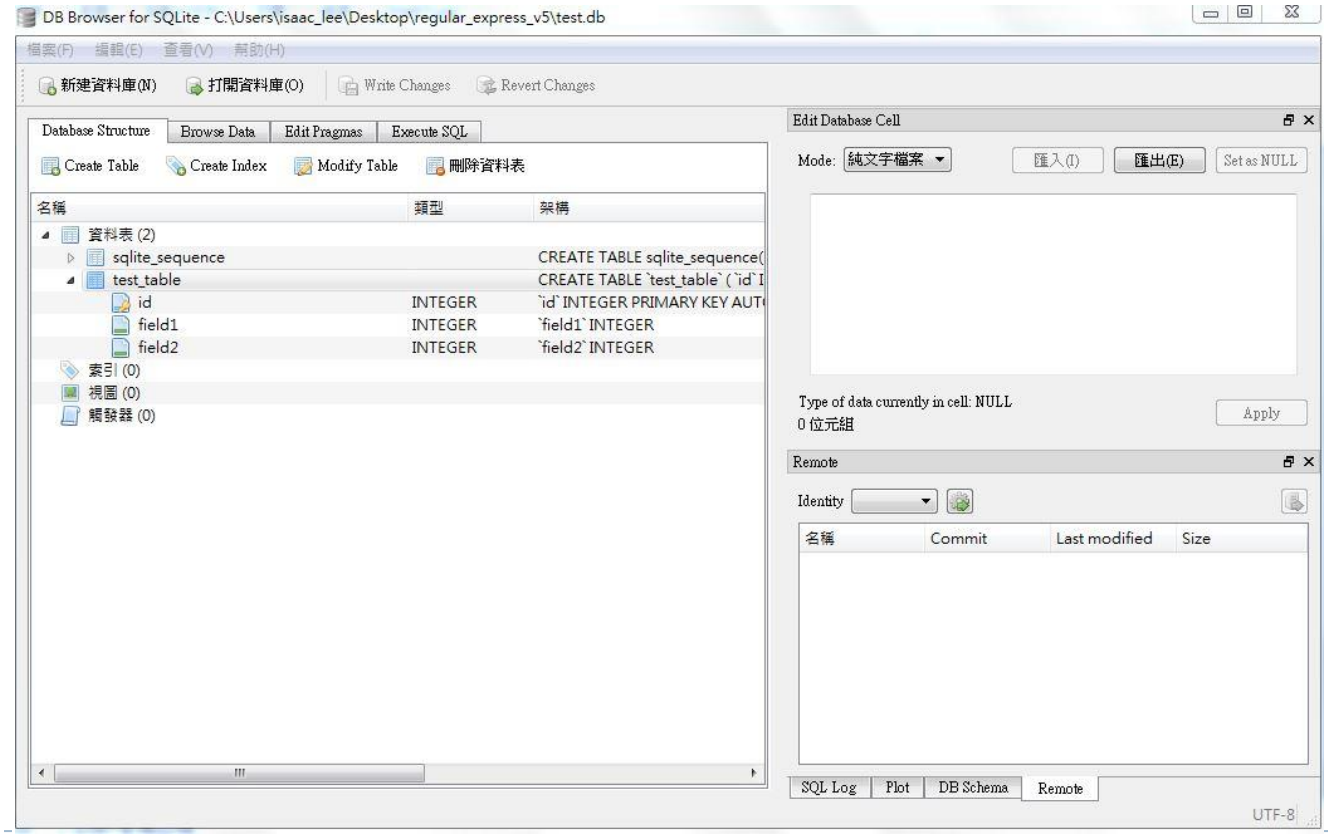
SQLite Installation

- Download and install sqlitebrowser from
  - http://sqlitebrowser.org/



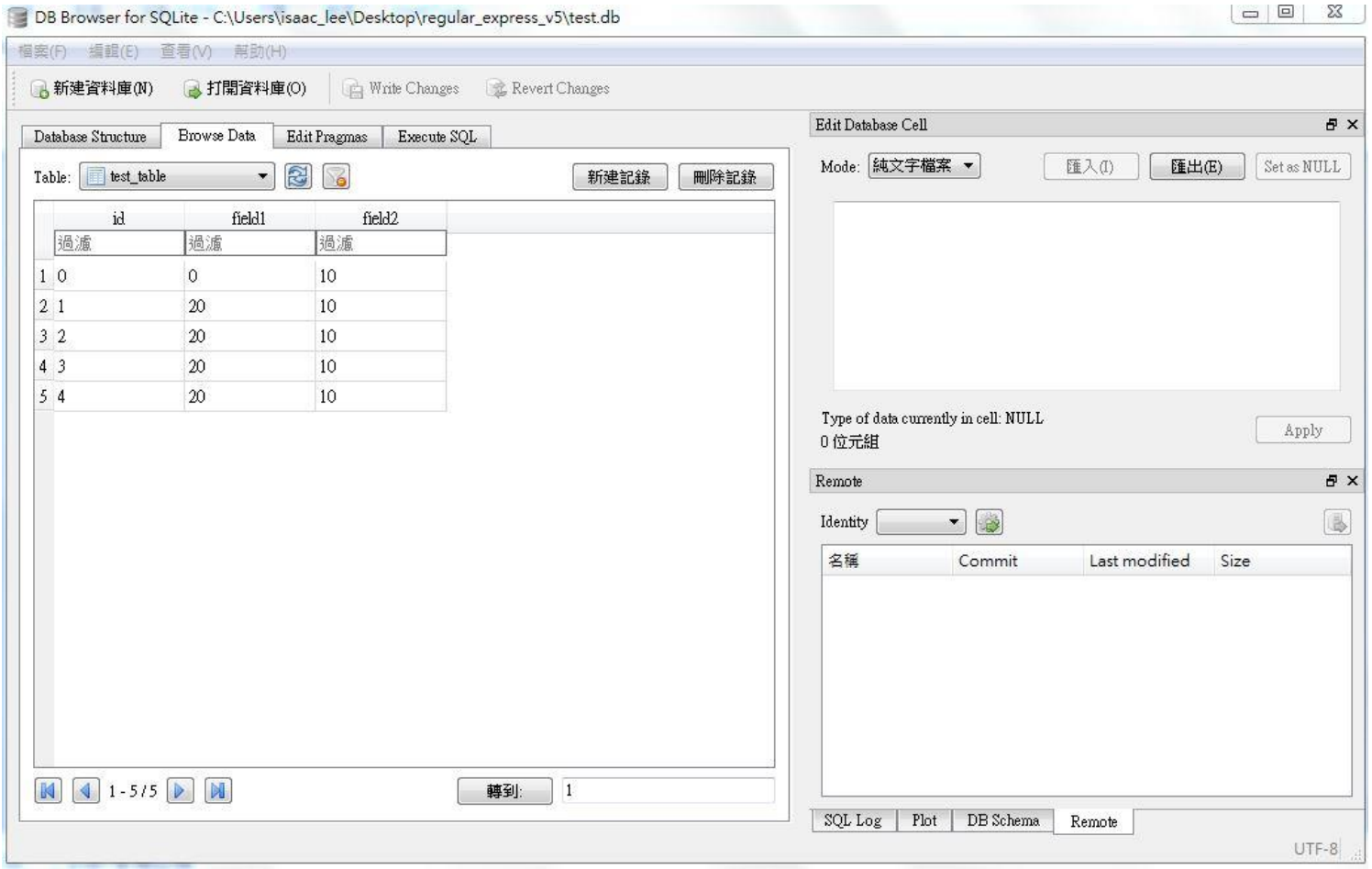
SQLite

- Create a database
- Create some table



SQLite

- Add values into the table



SQL

- SQL is a standard language for storing, manipulating and retrieving data in databases
  - Can be used in SQLite, MySQL, SQL Server, MS Access, etc……
  - Common cmd: CREATE, SELECT, INSERT, UPDATE…

SQL

SQLite Operation in Python

- Install SQLite module:
  - pip install sqlite3
- Import SQLite module in Python
  - import sqlite3
- Connect database
  - sqlite3.connect('<DatabaseName>.db')
- Set cursor
  - cursor()

SQLite Operation in Python

- Execute SQL cmd
  - execute('<SQL cmd>')
- Put modifications into the file
  - commit()
- Close the connection to database
  - close()

SQLite

- Example
  - Standard operation programming flow.

```
import sqlite3
import os

folder_path = os.getcwd()

conn = sqlite3.connect(folder_path + '/testDB.db')

c = conn.cursor()

c.execute("DROP TABLE IF EXISTS example")
c.execute("CREATE TABLE example (date text, name text, score text)")

conn.commit()

conn.close()
```

Import SQLite module

Build connection to db

Set cursor

SQL cmd

Confirm SQL cmd

Close connection to db

SQLite operation

- SQL cmd
  - DROP + EXIST
    - delete table name example if it exists

```
c.execute("DROP TABLE IF EXISTS example")
```

  - CREATE
    - create table with the following elements

```
c.execute("CREATE TABLE example (date text, name text, score text)")
```

  - INSERT
    - Put values into the table “example”

```
c.execute("INSERT INTO example VALUES ('2020-04-01','Jason','78')")
c.execute("INSERT INTO example VALUES ('2018-04-02','Mary','59')")
c.execute("INSERT INTO example VALUES ('2018-04-03','Celine','99')")
```

SQLite operation

- SQL cmd
  - SELECT
    - Select all data from table name example

```
1 for row in c.execute('SELECT * FROM example'):
2     print(row)
```

```
('2020-04-01', 'Jason', '78')
('2018-04-02', 'Mary', '59')
('2018-04-03', 'Celine', '99')
```

  - SELECT + ORDER BY
    - Select data from table name example in particular order

```
1 for row in c.execute('SELECT * FROM example ORDER BY score'):
2     print(row)
```

```
('2018-04-02', 'Mary', '59')
('2020-04-01', 'Jason', '78')
('2018-04-03', 'Celine', '99')
```

SQLite operation

- SQL cmd
  - SELECT + WHERE
    - Select all data from table name example with condition

```
1 for row in c.execute('SELECT * FROM example WHERE score > 60'):
2     print(row)
```

```
('2020-04-01', 'Jason', '78')
('2018-04-03', 'Celine', '99')
```

  - SELECT + DISTINCT
    - Find the different date data from table name example

```
1 for row in c.execute('SELECT DISTINCT date FROM example'):
2     print(row)
```

```
('2020-04-01',)
('2018-04-02',)
('2018-04-03',)
```

SQLite operation

- SQL cmd
  - SELECT + WHERE + AND
    - Select all data from table name example with condition

```
1 for row in c.execute('SELECT * FROM example WHERE score > 60 AND score > 90'):
2     print(row)
```

```
('2018-04-03', 'Celine', '99')
```

  - SELECT + WHERE + OR
    - Find the different date data from table name example

```
1 for row in c.execute('SELECT * FROM example WHERE score < 60 OR score > 90'):
2     print(row)
```

```
('2018-04-02', 'Mary', '59')
('2018-04-03', 'Celine', '99')
```

SQLite operation

- SQL cmd
  - UPDATE + SET + WHERE
    - Update specific data from table name example with condition

```
1  c.execute("UPDATE example SET score = 60 WHERE name = 'Mary' ")
2  conn.commit()
3
4  for row in c.execute('SELECT * FROM example'):
5      print(row)
6
```

```
('2020-04-01', 'Jason', '78')
('2018-04-02', 'Mary', '60')
('2018-04-03', 'Celine', '99')
```