README.md

SPJRUD to SQL

Purpose

The purpose of this project is to build a simple library to convert Relational Algebra operations (SPJRUD) to SQL queries. The project presents itself as a simple python library to import in a project or in an interactive python console. See Usage for more information.

Used operations (SPJRUD)

Below a list of the operations used in this project, with an explanation of what they are.

Selection

The selection operation selects tuples which satisfy the given predicate from a relation.

Projection

The projection operation projects column(s) that satisfy a given predicate.

Join

The projection operation combines two relations into one with a cartesian product.

Rename

The rename operation allows us to rename column(s) in the output relation.

Union

The results of the union operation are tuples, which are present in, at least one, of the two relations.

Difference

The result of the difference operation are tuples, which are present in the first relation but not in the second relation.

Usage

Here is an example of how the project is supposed to be used in interactive mode :

Import the module and set the database.

A function is included to set a database cursor. By default, the extension of the databases files is '.db' but a custom extension can be set as a second parameter for the function.

```
>>> from spjrud_to_sql import *
>>> c = set_db('database')
```

A file called "database.db" will then be created.

Fill or create a database.

If the database is empty, it can be filled with the given cursor.

```
>>> c.execute(''' CREATE TABLE Rouge (A TEXT, B TEXT, C NUMERIC)''')
>>> c.execute("INSERT INTO Rouge VALUES ('abc', 'klm', 1)")
>>> c.execute("INSERT INTO Rouge VALUES ('def', 'nop', 2)")
>>> c.execute("INSERT INTO Rouge VALUES ('hij', 'qrs', 3)")
```

Additionally, the `create_table()` function can be used to create a table based on another table which already exists by using the provided relational algebra functions explained below.

```
>>> create_table('Magenta', s(Attr('A'), Cst('abc'), Rel('Rouge')))
[('abc', 'klm', 1)]
Table Magenta successfully created.
```

SPJRUD operations.

From now the provided relational algebra operations can be used. Each operations can be used with a provided function which simply is the first letter of the operation. The `Relation`, `Attribute` and `Constant` objects can be respectively instanciate by `Rel()`, `Attr()` and `Cst()`. So, for example, if you want to project the attribute A in the relation called 'Rouge':

```
>>> p([Attr('A')], Rel('Rouge'))
[('abc',), ('def',), ('hij',)]
```

It will automatically print the output of the query. If you want to get the last output, you can get it with the `Database.current.output` variable.

Operation's arguments

Operation	Arguments
Select	An attribute, an attribute or a constant.
Project	A list of attributes, a relation/subquery.
Join	A relation/subquery, a relation/subquery
Rename	An attribute, a string, a relation/subquery
Union	A relation/subquery, a relation/subquery
Diff	A relation/subquery, a relation/subquery