

TP_BDD_Conception

May 27, 2020

```
In [ ]: %reload_ext sql
        %config SqlMagic.displaycon = False
        %config SqlMagic.autolimit = 100
```

1 Travaux pratiques bases de données : conception

IMPORTANT : par défaut, la vérification des clefs étrangère n'est pas activée dans SQLite <https://www.sqlite.org/foreignkeys.html>, activez là avec la commande :

```
PRAGMA foreign_keys=1;
```

```
In [89]: %%sql
```

```
PRAGMA foreign_keys=1;
```

Done.

```
Out[89]: []
```

1.1 Exercice : variations sur le thème de la clef primaire

On considère le script SQL suivant :

```
CREATE TABLE Classe(
    id INTEGER PRIMARY KEY,
    description TEXT
);

CREATE TABLE Herite(
    enfant INT REFERENCES Classe(id),
    parent INT REFERENCES Classe(id),
    PRIMARY KEY (enfant, parent)
);

INSERT INTO Classe VALUES(0, 'chose');
INSERT INTO Classe VALUES(1, 'animal');
```

```

INSERT INTO Classe VALUES(2, 'humain');
INSERT INTO Classe VALUES(3, 'enseignant');
INSERT INTO Classe VALUES(4, 'chat');
INSERT INTO Classe VALUES(5, 'science');

```

```

INSERT INTO Herite VALUES(1, 0);
INSERT INTO Herite VALUES(2, 1);
INSERT INTO Herite VALUES(3, 2);
INSERT INTO Herite VALUES(4, 1);
INSERT INTO Herite VALUES(3, 5);

```

In [125]: %sql sqlite:///exo1-q1.db

In [126]: %%sql

```

CREATE TABLE Classe(
    id INTEGER PRIMARY KEY,
    description TEXT
);

CREATE TABLE Herite(
    enfant INT REFERENCES Classe(id),
    parent INT REFERENCES Classe(id),
    PRIMARY KEY (enfant, parent)
);

INSERT INTO Classe VALUES(0, 'chose');
INSERT INTO Classe VALUES(1, 'animal');
INSERT INTO Classe VALUES(2, 'humain');
INSERT INTO Classe VALUES(3, 'enseignant');
INSERT INTO Classe VALUES(4, 'chat');
INSERT INTO Classe VALUES(5, 'science');

INSERT INTO Herite VALUES(1, 0);
INSERT INTO Herite VALUES(2, 1);
INSERT INTO Herite VALUES(3, 2);
INSERT INTO Herite VALUES(4, 1);
INSERT INTO Herite VALUES(3, 5);

```

```

(sqlite3.OperationalError) table Classe already exists
[SQL: CREATE TABLE Classe( id INTEGER PRIMARY KEY,
    description TEXT
);]
(Background on this error at: http://sqlalche.me/e/e3q8)

```

Exercice : on veut s'habituer aux messages d'erreurs standards :

- insérez un nouveau tuple avec `INSERT INTO Classe VALUES(0, 'patate');`. Quel est le message d'erreur ? Idem avec `INSERT INTO Herite VALUES(1, 0);`

- insérez un nouveau tuple avec `INSERT INTO Herite VALUES(0, 42);`. Quel est le message d'erreur ? (NB : si vous n'en avez pas, c'est que les clefs étrangères ne sont pas activées !)

In [127]: `%%sql`

```
INSERT INTO Classe VALUES(0, 'patate');
```

```
--IntegrityError: (sqlite3.IntegrityError) UNIQUE constraint failed: Classe.id
[SQL: INSERT INTO Classe VALUES(0, 'patate');]
```

IntegrityError

Traceback (most recent call last)

```
~/local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in _execute_context(self,
1283         self.dialect.do_execute(
-> 1284         cursor, statement, parameters, context
1285     )
```

```
~/local/lib/python3.6/site-packages/sqlalchemy/engine/default.py in do_execute(self, c
589     def do_execute(self, cursor, statement, parameters, context=None):
--> 590         cursor.execute(statement, parameters)
591
```

IntegrityError: UNIQUE constraint failed: Classe.id

The above exception was the direct cause of the following exception:

IntegrityError

Traceback (most recent call last)

```
<ipython-input-127-ff608e20959d> in <module>
----> 1 get_ipython().run_cell_magic('sql', '', "\nINSERT INTO Classe VALUES(0, 'patate');")
```

```
~/local/lib/python3.6/site-packages/IPython/core/interactiveshell.py in run_cell_magi
2360     def system_raw(self, cmd):
2361         """Call the given cmd in a subprocess using os.system on Windows or
-> 2362         subprocess.call using the system shell on other platforms.
2363
2364         Parameters
```

```
<decorator-gen-157> in execute(self, line, cell, local_ns)
```

```

~/.local/lib/python3.6/site-packages/IPython/core/magic.py in <lambda>(f, *a, **k)
185     """Decorator factory for methods in Magics subclasses.
186     """
--> 187
188     validate_type(magic_kind)
189

<decorator-gen-156> in execute(self, line, cell, local_ns)

~/.local/lib/python3.6/site-packages/IPython/core/magic.py in <lambda>(f, *a, **k)
185     """Decorator factory for methods in Magics subclasses.
186     """
--> 187
188     validate_type(magic_kind)
189

~/.local/lib/python3.6/site-packages/sql/magic.py in execute(self, line, cell, local_ns)
215
216     try:
--> 217         result = sql.run.run(conn, parsed["sql"], self, user_ns)
218
219         if (

~/.local/lib/python3.6/site-packages/sql/run.py in run(conn, sql, config, user_namespace)
365     else:
366         txt = sqlalchemy.sql.text(statement)
--> 367         result = conn.session.execute(txt, user_namespace)
368         _commit(conn=conn, config=config)
369         if result and config.feedback:

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in execute(self, object)
1018     )
1019     else:
-> 1020         return meth(self, multiparams, params)
1021
1022     def _execute_function(self, func, multiparams, params):

~/.local/lib/python3.6/site-packages/sqlalchemy/sql/elements.py in _execute_on_connection
296     def _execute_on_connection(self, connection, multiparams, params):
297         if self.supports_execution:

```

```

--> 298         return connection._execute_clauseelement(self, multiparams, params)
      299     else:
      300         raise exc.ObjectNotExecutableError(self)

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in _execute_clauseelement
1137         distilled_params,
1138         compiled_sql,
-> 1139         distilled_params,
1140     )
1141     if self._has_events or self.engine._has_events:

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in _execute_context(self,
1322     except BaseException as e:
1323         self._handle_dbapi_exception(
-> 1324             e, statement, parameters, cursor, context
1325         )
1326

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in _handle_dbapi_exception
1516     elif should_wrap:
1517         util.raise_(
-> 1518             sqlalchemy_exception, with_traceback=exc_info[2], from_=e
1519         )
1520     else:

~/.local/lib/python3.6/site-packages/sqlalchemy/util/compat.py in raise_(***failed res
176
177     try:
--> 178         raise exception
179     finally:
180         # credit to

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in _execute_context(self,
1282         if not evt_handled:
1283             self.dialect.do_execute(
-> 1284                 cursor, statement, parameters, context
1285             )
1286

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/default.py in do_execute(self,
588
589     def do_execute(self, cursor, statement, parameters, context=None):

```

```
--> 590         cursor.execute(statement, parameters)
591
592     def do_execute_no_params(self, cursor, statement, context=None):

IntegrityError: (sqlite3.IntegrityError) UNIQUE constraint failed: Classe.id
[SQL: INSERT INTO Classe VALUES(0, 'patate');]
(Background on this error at: http://sqlalche.me/e/gkpb)
```

In [128]: %%sql

```
INSERT INTO Herite VALUES(1, 0);
```

```
--IntegrityError: (sqlite3.IntegrityError) UNIQUE constraint failed: Herite.enfant,
[SQL: INSERT INTO Herite VALUES(1, 0);]
```

```
-----

IntegrityError                                Traceback (most recent call last)

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in _execute_context(self,
1283         self.dialect.do_execute(
-> 1284         cursor, statement, parameters, context
1285         )

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/default.py in do_execute(self,
589     def do_execute(self, cursor, statement, parameters, context=None):
-> 590         cursor.execute(statement, parameters)
591
```

```
IntegrityError: UNIQUE constraint failed: Herite.enfant, Herite.parent
```

The above exception was the direct cause of the following exception:

```
IntegrityError                                Traceback (most recent call last)

<ipython-input-128-aea883e35b1c> in <module>
----> 1 get_ipython().run_cell_magic('sql', '', '\nINSERT INTO Herite VALUES(1, 0);\n\n--I

~/.local/lib/python3.6/site-packages/IPython/core/interactiveshell.py in run_cell_magi
2360     def system_raw(self, cmd):
```

```

2361         """Call the given cmd in a subprocess using os.system on Windows or
-> 2362         subprocess.call using the system shell on other platforms.
2363
2364         Parameters

<decorator-gen-157> in execute(self, line, cell, local_ns)

~/.local/lib/python3.6/site-packages/IPython/core/magic.py in <lambda>(f, *a, **k)
185     """Decorator factory for methods in Magics subclasses.
186     """
--> 187
188     validate_type(magic_kind)
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186     """
--> 187
188     validate_type(magic_kind)
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~/.local/lib/python3.6/site-packages/sql/magic.py in execute(self, line, cell, local_ns)
215
216         try:
--> 217             result = sql.run.run(conn, parsed["sql"], self, user_ns)
218
219             if (

~/.local/lib/python3.6/site-packages/sql/run.py in run(conn, sql, config, user_namespace)
365         else:
366             txt = sqlalchemy.sql.text(statement)
--> 367             result = conn.session.execute(txt, user_namespace)
368             _commit(conn=conn, config=config)
369             if result and config.feedback:

~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in execute(self, object,
1018         )
1019         else:
-> 1020             return meth(self, multiparams, params)

```

```

1021
1022     def _execute_function(self, func, multiparams, params):

~/.local/lib/python3.6/site-packages/sqlalchemy/sql/elements.py in _execute_on_connection
296     def _execute_on_connection(self, connection, multiparams, params):
297         if self.supports_execution:
--> 298             return connection._execute_clauseelement(self, multiparams, params)
299         else:
300             raise exc.ObjectNotExecutableError(self)

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1137         distilled_params,
1138         compiled_sql,
-> 1139         distilled_params,
1140     )
1141     if self._has_events or self.engine._has_events:

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1322     except BaseException as e:
1323         self._handle_dbapi_exception(
-> 1324             e, statement, parameters, cursor, context
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-> 1518                 sqlalchemy_exception, with_traceback=exc_info[2], from_=e
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~/.local/lib/python3.6/site-packages/sqlalchemy/util/compat.py in raise_(***failed res
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1282         if not evt_handled:
1283             self.dialect.do_execute(
-> 1284                 cursor, statement, parameters, context

```



```
1285         )
1286
```

```
~/.local/lib/python3.6/site-packages/sqlalchemy/engine/default.py in do_execute(self, c
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589     def do_execute(self, cursor, statement, parameters, context=None):
--> 590         cursor.execute(statement, parameters)
591
592     def do_execute_no_params(self, cursor, statement, context=None):
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```
IntegrityError: (sqlite3.IntegrityError) UNIQUE constraint failed: Herite.enfant, Herite.parent
[SQL: INSERT INTO Herite VALUES(1, 0);]
(Background on this error at: http://sqlalche.me/e/gkpi)
```

```
In [130]: %%sql
```

```
INSERT INTO Herite VALUES(0, 42);
```

```
--IntegrityError: (sqlite3.IntegrityError) FOREIGN KEY constraint failed
[SQL: INSERT INTO Herite VALUES(0, 42);]
```

```
-----
IntegrityError                                Traceback (most recent call last)
```

```
~/.local/lib/python3.6/site-packages/sqlalchemy/engine/base.py in _execute_context(self, dialect, cursor, statement, parameters, context)
1283         self.dialect.do_execute(
-> 1284             cursor, statement, parameters, context
1285         )
```

```
~/.local/lib/python3.6/site-packages/sqlalchemy/engine/default.py in do_execute(self, c
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--> 590         cursor.execute(statement, parameters)
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```

```
IntegrityError: UNIQUE constraint failed: Herite.enfant, Herite.parent
```

The above exception was the direct cause of the following exception:

```
IntegrityError                                Traceback (most recent call last)
```

```

<ipython-input-130-66b1f41292c5> in <module>
----> 1 get_ipython().run_cell_magic('sql', '', '\nINSERT INTO Herite VALUES(0, 42);\n\n--

~/local/lib/python3.6/site-packages/IPython/core/interactiveshell.py in run_cell_magic
2360     def system_raw(self, cmd):
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365     else:
366         txt = sqlalchemy.sql.text(statement)
--> 367         result = conn.session.execute(txt, user_namespace)
368         _commit(conn=conn, config=config)

```

```

369             if result and config.feedback:

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~/local/lib/python3.6/site-packages/sqlalchemy/engine/default.py in do_execute(self, c
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589     def do_execute(self, cursor, statement, parameters, context=None):
--> 590         cursor.execute(statement, parameters)
591
592     def do_execute_no_params(self, cursor, statement, context=None):
```

```
IntegrityError: (sqlite3.IntegrityError) UNIQUE constraint failed: Herite.enfant, Herite.parent
[SQL: INSERT INTO Herite VALUES(0, 42);]
(Background on this error at: http://sqlalche.me/e/gkpb)
```

```
In [131]: %%sql
```

```
INSERT INTO Herite VALUES(0, 1);
```

```
1 rows affected.
```

```
Out[131]: []
```

```
In [132]: %%sql
```

```
SELECT * FROM Herite;
```

```
Done.
```

```
Out[132]: [(1, 0), (2, 1), (3, 2), (4, 1), (3, 5), (0, 42), (0, 1)]
```

Exercice : dessinez un diagramme Entité-Association du schéma de cette base. Ensuite, représentez graphiquement *le contenu* de cette base par une hiérarchie entre les classes.

- Premier diagramme :