The Philosopher's Groan

How I Learned to Love SQLAlchemy

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Conclusion?

Python needs to talk to SQL Databases.

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Like, all the time. 😳

Object

Relational

Mapping


and black with fate

SQLAlchemy Offers Us 2.5 Ways of Doing Things

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1. sqlalchemy.orm
2. sqlalchemy.core
3. “headless” sqlalchemy.core*

*i made that term up


FUNiMATION

Quick Run Through of Some ORM Code

```python
# ddl
class Baker(Base):
    __tablename__ = "baker"

    id = Column(Integer, primary_key=True)
    name = Column(String, nullable=False)
    pronouns = Column(String)


    def __repr__(self):
        return f"<Baker {self.name} ({self.pronouns})>"
```

```
# insert
to_insert = [
    ["Ed", "he/him"], ["Zeb", "they/them"],
    ["Rheta", "she/her"], ["Brad", None],
]
session.add_all(
    [
        Baker(name=name, pronouns=pronouns)
        for name, pronouns in to_insert
    ]
)
session.commit()
```

```
# select and delete
no_pronouns = session.query(Baker).filter(
    Baker.pronouns is None
)
no_pronouns.delete()

session.commit()
```

So why ORM?

So why ORM?

1. You like OOP, ORMs, Python, or any combo of the 3.
2. Your i/o is straightforward, your db is clean.
3. You like Django.
4. You want predictable code.

Quick Run Through of Common Core Code

```
# ddl
baker = Table(
    "baker",
    metadata,
    Column("id", Integer, primary_key=True),
    Column("name", String, nullable=False),
    Column("pronouns", String),
)
```

```
# insert
to_insert = [
    ["Ed", "he/him"], ["Zeb", "they/them"],
    ["Rheta", "she/her"], ["Brad", None],
]
insert_statement = baker.insert().values(
    [
        {"name": name, "pronouns": pronouns}
        for name, pronouns, dt in to_insert
    ]
)
conn.execute(insert_statement)
```

```
# select and delete
delete_statement = (
    select([baker])
    .where(baker.c.pronouns is None)
    .delete()
)

conn.execute(delete_statement)
```

So why Core?

So why Core?

1. You like FP and native data structures.
2. You dislike Django.
3. Your queries are complicated.
4. You are a native SQL speaker. You speak SQL eloquently. You love SQL.


PeacEclectic

The Engine

```
# common to core and orm
from sqlalchemy import create_engine

engine = create_engine(“db://nice.url)
engine.dispose()
```

The Database Schema

```python
# core
from sqlalchemy import MetaData
metadata = MetaData(bind=engine)

#orm
from sqlalchemy.ext.declarative import declarative_base
Base = declarative_base(bind=engine)
Base.metadata
```

Table Abstractions

```
# core
Table()

# orm
declarative_base()

mapper()

# common
Column()


# headless
metadata.tables[“table_name”]
```

```python
class Baker(Base):
    __tablename__ = "baker"

    id = Column(Integer, primary_key=True)
    name = Column(String, nullable=False)
    pronouns = Column(String)
    specialties = relationship(
        "Bread",
        secondary=baker_specialty,
        back_populates="specializing_bakers"
    )

    def __repr__(self):
        return f"<Baker {self.name} {self.pronouns}>"
```

```
baker = Table(
    "baker",
    metadata,
    Column("id", Integer, primary_key=True),
    Column("name", String, nullable=False),
    Column("pronouns", String),
)
```

```
metadata = MetaData(bind=engine)
metadata.reflect_all()

bakery = metadata.tables["baker"]
```

Connections & Transactions

```python
# orm
from sqlalchemy.orm.session import sessionmaker
Session = sessionmaker()  # global
session = Session(bind=engine)  # local
```

```
#notable session attrs
add()
add_all()
delete()
new
dirty
query()
rollback()
commit()
```

```
# core
conn = engine.connect()  # engine: global, conn: local

conn.execute(statement)
conn.close()
```

```
# lesser known conn methods
transaction = conn.begin()
conn.execute(statement)  # not executed till commit
transaction.commit()

raw_conn = engine.raw_connection()  # for barbarians
```

Queries & Queryish Constructs

```python
# creation
wonderbread = Bread(
    name="wonder",
    is_delicious=False,
    ingredient_cost=0.60
)

session.add(wonderbread)

wonderbread.name = "wonderbread"  # session remembers this mutation
session.commit()  # insert emitted now
```

```
# creation
inset_smt = bread.insert().values(
    {"name": "wonder","is_delicious": False, "ingredient_cost": 0.60},
)
conn.execute(insert_smt)

update_smt = (
  bread.update()
   .where(bread.c.name == "wonder")
   .values(name="wonderbread")
)
conn.execute(update_smt)
```

```
talented_lady_bakers = (
    session.query(Baker.name, Bread.name)
    .select_from(Baker)
    .join(baker_specialty)
    .join(Bread)
    .filter(
        Bread.is_delicious == True,
        Baker.pronouns == "she/her",
    )
   .all() # nothing executed on db until here
)
```

```
join = baker.join(baker_specialty).join(bread)
select_smt = (
    select([baker.c.name, bread.c.name])
    .select_from(join)
    .where(
        and_(
            bread.c.is_delicious == True,
            baker.c.pronouns == "she/her",
        )
    )
)
talented_lady_bakers = conn.execute(select_smt).fetchall()
```

```sql
SELECT baker.name, bread.name
FROM baker
JOIN baker_specialty
ON baker.id = baker_specialty.baker_id
JOIN bread
ON bread.id = baker_specialty.bread_id
WHERE bread.is_delicious = true
AND baker.pronouns = 'she/her'
```

What do we make of this?

ORM is an ORM.

There are great conveniences for dealing with:

- i/o spanning database relationships
- business logic
- consistent code

Core is *almost* SQL.

SQL-heads will prefer it: No need to learn new ideas if you're already SQL fluent.

Low-level tools allow for more creative, customized problem solving.

Both may have a place in your codebase.

All the different ways of doing the same thing make it obvious when different kinds of alchemy are happening.


Thanks for listening!
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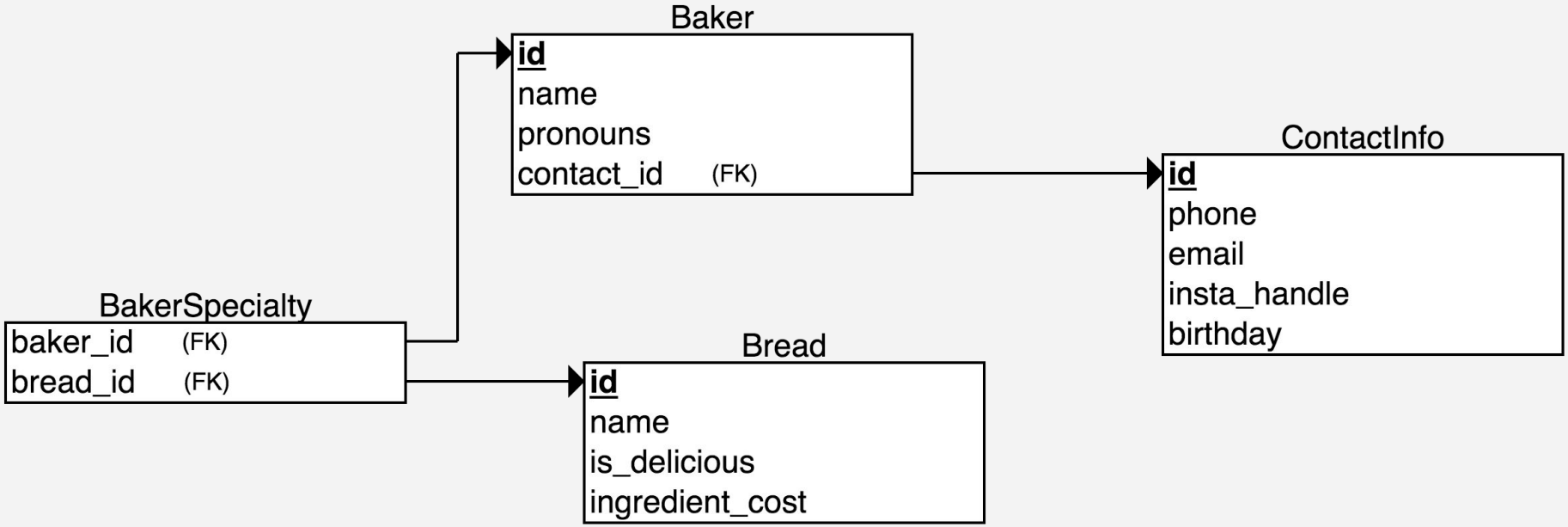
Baker
id
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birthday
BakerSpecialty
baker_id (FK)
bread_id (FK)
Bread
id
name
is_delicious
ingredient_cost