

#### Today's Goals

By the end of this class, you will:



Use SQLAlchemy ORM to model tables.



Perform CRUD with SQLAlchemy.



Reflect existing databases with SQLAlchemy.



Plot query results from SQLAlchemy ORM.

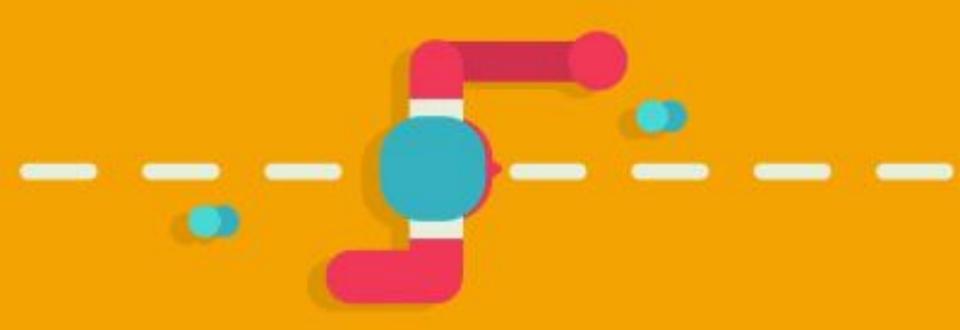


Run a t-test to validate differences in means.



Instructor Demonstration SQLAlchemy Queries In Action

## Lets Run through a Review!





How can you query a database using SQLAlchemy?

#### There are two ways to query a database using SQLAlchemy

Using more SQL...

```
data = engine.execute("SELECT * FROM BaseballPlayer")
```

#### ...or more Python!

```
players = session.query(BaseballPlayer)
for player in players:
    print(player.name_given)
```



What is a t-test, and what is it used for?

#### A t-test is used to test the difference between means!

#### There are two types of (two-sample) t-tests

O1 Paired



- Compares the means of the **same** group
- Example:
  - Mean blood pressure before and after medication





- Compares the means of **different** group
- Example:
  - Cost of restaurant dinners in Minnesota vs. Texas





### **Activity: Sharks Search**

In this activity, you will create a Python script that can search through the SQL file of shark attacks provided.

(Instructions sent via Slack.)



#### **Sharks Search Instructions**

- Within a Python script, create a Sharks class that will be able to read all of the columns in from the table you created
- Using SQLAlchemy, perform the following queries...
  - Print all locations of shark attacks
  - Find the number of provoked attacks
  - Find the number of attacks in the USA
  - Find the number of attacks in 2017
  - Find the number of attacks while surfing
  - Find the number of fatal attacks
  - Find the number of fatal attacks while surfing
  - Find the number of fatal attacks in Mozambique while spearfishing



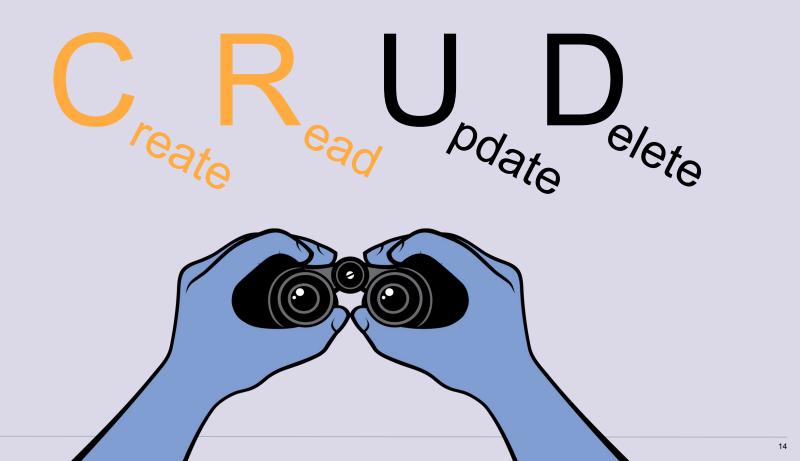


Time's Up! Let's Review.



Instructor Demonstration Updating and Deleting Rows

#### We have only looked at one-half of CRUD!







# Activity: What a Cruddy Database

In this activity, **you and a partner** will create a new SQLite database for a garbage collection company.

(Instructions sent via Slack.)



#### What a Cruddy Database Instructions

- Within the unsolved Python file, create new SQLAlchemy class called Garbage that holds the values outlined in the Readme.md
- Create a connection and a session before adding a few items into the SQLite database crafted.
- Update the values within at least two of the rows added to the table.
- Delete the row with the lowest weight from the table.
- Print out all of the data within the database.





Time's Up! Let's Review.





Instructor Demonstration Reflections

But how can we analyze databases that already exist?

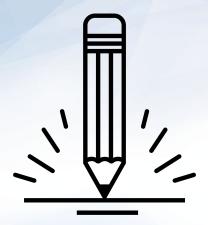




#### Looking at our Reflection

```
# Python SQL toolkit and Object Relational Mapper
import sqlalchemy
from sqlalchemy.ext.automap import automap base
from sqlalchemy.orm import Session
from sqlalchemy import create engine
# Create engine using the `demographics.sqlite` database file
engine = create engine("sqlite:///../Resources/dow.sqlite")
# Declare a Base using `automap base()`
Base = automap base()
# Use the Base class to reflect the database tables
Base.prepare(engine, reflect=True)
# Print all of the classes mapped to the Base
Base.classes.keys()
```





## **Activity: Reflecting on SQL**

In this activity, you will practice your ability to reflect existing databases using SQLAlchemy and a SQLite table focused upon demographic data.

(Instructions sent via Slack.)



#### Reflecting on SQL Instructions

- Create engine using the demographics.sqlite database file
- Declare a Base using automap\_base() and use this new Base class to reflect the database's tables
- Assign the demographics table/class to a variable called Demographics
- Create a session and use this session to query the Demographics table and display the first five locations





Time's Up! Let's Review.



Instructor Demonstration SQLAlchemy Exploration

#### Reflecting on Reflections



- Reflecting using SQLAlchemy does not provide users with information on what is being stored
- The creators of SQLAlchemy understood this
  - They also created an inspector tool
- Inspector is used to look up tables, columns and datatypes.

```
import sqlalchemy
from sqlalchemy.ext.automap import automap_base
from sqlalchemy.orm import Session
from sqlalchemy import create_engine, inspect

# Create the connection engine
engine = create_engine("sqlite:///../Resources/database.sqlite")

# Create the inspector and connect it to the engine
inspector = inspect(engine)

# Collect the names of tables within the database
inspector.get_table_names()
```

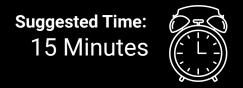




## **Activity: Salary Exploration**

In this activity, you will create an inspector and search through a SQLite database of salaries from San Francisco.

(Instructions sent via Slack.)



#### **Salary Exploration Instructions**

- Using the attached SQLite file, use an inspector to collect the following information...
- The names of all of the tables within the database.
- The column names and data types for the Salaries table.





Time's Up! Let's Review.



## **Activity: Emoji Plotting**

In this activity, you will will join forces to create a plot based upon the data stored within a SQLite database.

(Instructions sent via Slack.)



#### **Emoji Plotting Instructions**

- Use the inspector to explore the database and print out the table names stored within it.
- Using the inspector, print out the column names and types for each of the tables contained within the SQLite file.
- Reflect the database into a SQLAlchemy class and start a session that can be used to query the database.
- Using Matplotlib, create a horizontal bar chart and plot the emoji score in descending order. Use emoji\_char as the y-axis labels and plot only the top 10 emojis ranked by score
- Create the same kind of chart using Pandas to plot the data instead of Matplotlib.





Time's Up! Let's Review.