Database Systems & GUI in Python

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What Python Libraries will you need

Install and Import sqlite3

Import tkinter - should already be installed

Import pandas - may need to install

Import numpy - may need to install

Setting Up SQLite3

1 | Create a Connection for SQLite3

```
connection = sqlite3.connect("Whales.db")
```

2 | Set up the Cursor in your new Connection

```
cursor = connection.cursor()
```

Example Database Tables

Database to track whales so that scientists can learn how to care for the world largest mammals.

1) Whales - includes a tracking number, length, weight, latitude, longitude, species and body of water.
2) Waters - includes the name, the average depth and whether it has saltwater or freshwater.

Executing SQL Statements

1. Use the cursor.execute command to execute SQL statements.
    a. Use 3 quotes like a doc-string or just one quote like a string.

```
cursor.execute("""CREATE TABLE Waters ("Name_" varchar(20), "AveDepth" int, "SaltOrFresh" Varchar(1), PRIMARY KEY ("Name_"));""")
```

    b. Use just 1 quote like a string.

```
cursor.execute("DROP TABLE Waters;")
```

Entering Data

```
cursor.execute("""INSERT INTO Waters (Name_,AveDepth,SaltOrFresh)
VALUES ("Atlantic", 4500, "S");""")

Data_to_insert = """INSERT INTO Whales (TrackingNumber, Length, Weight,
                  Longitude, Latitude, Species, Ocean)
                  VALUES (1,100,105,44.4311,25.1167,"Blue","Atlantic");"""

cursor.execute(Data_to_insert)
```

Create GUI to Enter Dynamic Data

Use tkinter package to create windows, frames, labels, prompts, buttons and a whole lot more.

Create a class called GUI and Initialize it with all the objects you will need in you GUI

Read the data from the prompts in the GUI.

Set up the GUI

```
class GUI:
    def __init__(self):
        self.main_window = tk.Tk()
        self.main_window.title("Enter a Whale")
        self.frame1 = tk.Frame(self.main_window)
        self.prompt_label1 = tk.Label(self.frame1, text = "Enter a Whale Tracking
        Number:                              ")
        self.prompt_label1.config(font = ('Courier',15),bg = 'lightblue')
        self.TN = tk.Entry(self.frame1, width = 10)
        self.prompt_label1.pack(side = 'left')
        self.TN.pack(side='left')
```

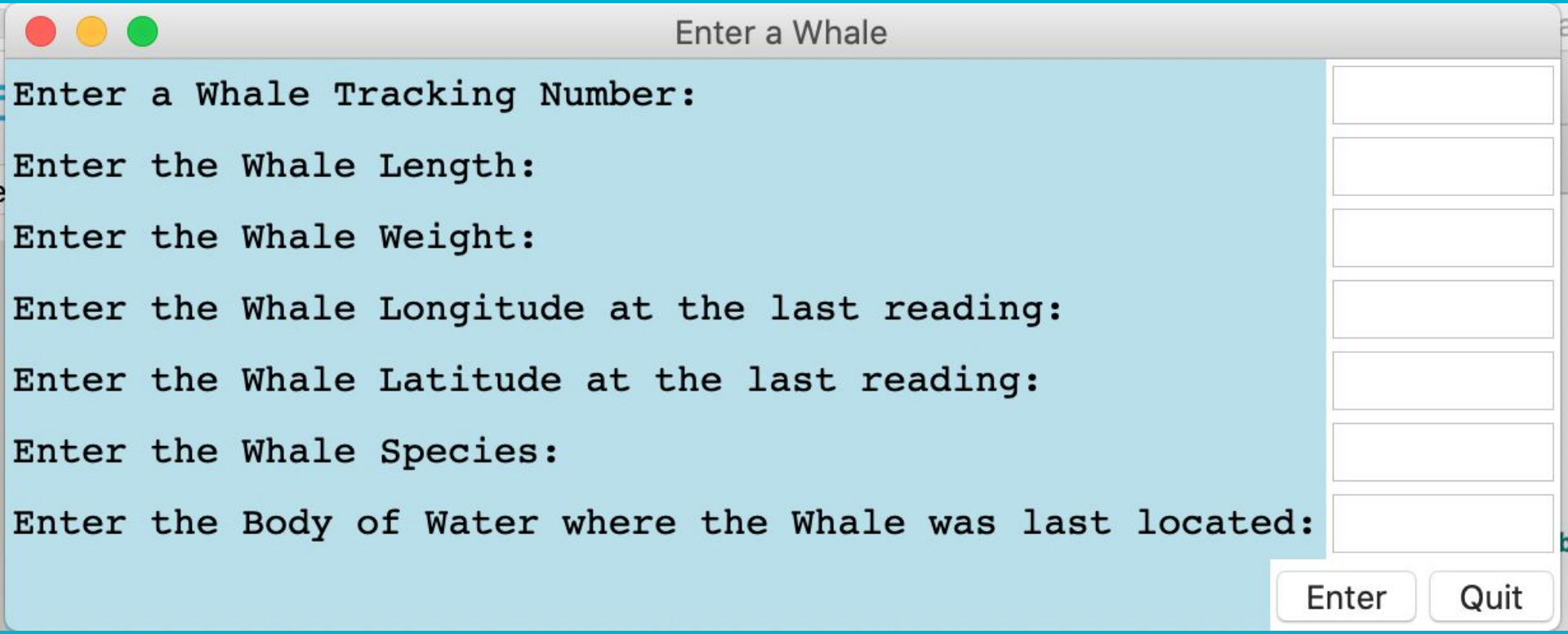
Read Data from Prompt

Read method:

1) Reads in the data from the prompt
2) Adds it in the appropriate order to the database
3) Clears all the prompts to accept more information from the user.

```
def enter(self):
   tn = self.TN.get()
cursor.execute("INSERT INTO Whales VALUES (?,?,?,?,?,?,?);", (tn, len, we,
lon, lat, s, o))
self.TN.delete(0,'end')
```

GUI interface



Queries 1

Get information out of the database:

You can get information out of one table like this:

```
Blue_len = cursor.execute("SELECT Length FROM Whales WHERE Species = 'Blue';")
```

The Blue Whales are: 100.0 Feet Long and 105.0 Feet Long Respectively.

The Average Length of the Blue whales in our Data is: 102.5

Queries 2

Or you can select from multiple tables like this:

```
fresh = cursor.execute("SELECT Species, Name_, Latitude, Longitude FROM Whales INNER JOIN Waters ON Whales.Ocean=Waters.Name_ WHERE SaltOrFresh = 'F'; ")
```

Resulting in this:

The following whales are not safe in freshwater: [('Beluga', 'Great_Lakes', 43.9968, 77.5312), ('Beluga', 'Great_Lakes', 43.9969, 77.5311)]

Commit Transactions and Close Connection

```
connection.commit()
```

```
connection.close()
```

Demonstrate the Program ...

Questions?