THE UNIVERSITY OF TENNESSEE CHATTANOOGA

Database Tables and Python

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Agenda

- Database Review
- MySQL/MariaDB Basics
- Important MariaDB Commands
- MariaDB and Python

Learning Objectives

- Set up a simple database
- Set up a simple table
- Connect the database to Python
- Read and write data from Python

Database Review

- A database is an organized collection of structured information, or data, typically stored electronically in a computer system
- The data or information for the database are often stored in tables
- A database management system (DBMS) is the software that interacts with end users, applications, and the database itself to capture and analyze the data

MySQL/MariaDB

- One of the preferred database management systems to use on a Raspberry Pi is a fork of MySQL called MariaDB

MySQL/MariaDB

- MariaDB has heightened popularity for many reasons
  - It is free, open-source, quick, and powerful
    - MariaDB can easily handle tables containing millions of rows
- MariaDB even offers online training and tutorials for free

MySQL/MariaDB

- While it is not necessary, it is common to type database commands in all capital letters to help distinguish command words from arguments
- When typing commands in MariaDB the command line must end with a semicolon before the Enter key executes the command - just pressing Enter will simply go to the next line, which can be helpful to keep long commands organized
  - For example:

```
CREATE TABLE Contacts (
ContactID INT AUTO_INCREMENT PRIMARY KEY,
FirstName VARCHAR(15),
LastName VARCHAR(20),
PhoneNumber VARCHAR(11),
EmailAddress VARCHAR(50) );
```

MariaDB Important Commands

- Database creation is quite intuitive on MariaDB
  - >**CREATE DATABASE DatabaseName;**
- To enter into a database you would enter the following
  - >**USE DatabaseName;**
- Once inside the database, you could create a table using
  - >**CREATE TABLE TableName(ColumnName DATATYPE , …);**
- To see the setup of a table you would enter the following
  - >**DESCRIBE TableName;**
- Populating the table can get a little more complex
  - >**INSERT INTO TableName (ColumnName(s)) VALUES (Values);**
- To view the entire contents of a table, enter the following
  - >**SELECT * FROM TableName;**
- In order to exit MariaDB in the terminal, simply type "**exit**"
- There are numerous other commands for MariaDB that you can explore via the MariaDB website

MariaDB and Python

- While you can use MariaDB entirely from the terminal, it is often more user friendly to create a Python script to help interact with the databases and tables
- To do this you must use a MariaDB/Python Connector
  - This means that at the beginning of any Python script that you would like to interact with MariaDB you must have code similar to the following slide at the beginning of the script
  - Variables in the connector will be changed as necessary (i.e. different users, different databases, different hosts)

MariaDB and Python

```
import mariadb
import sys

# Connect to MariaDB Platform
try:
    conn = mariadb.connect(
        user="Meredith",
        password="Grey",
        host="localhost",
        port=3306,
        database="ContactBook")

except mariadb.Error as e:
    print(f"Error connecting to MariaDB Platform: {e}")
    sys.exit(1)

# Get Cursor
cur = conn.cursor()
```

MariaDB and Python

- In addition to the preceding code segment, each script needs these two lines at the end:

```
conn.commit()
conn.close()
```

- conn.commit() commits any pending transaction to the database
- conn.close() closes the MariaDB connection to avoid keeping unused connections open and thus wasting resources

MariaDB and Python

- In order to populate a table with data via Python you would use the execute method. An example of this is provided:

```
##Inserts the name into the table and gets the id for the name
cur = conn.cursor()
cur.execute(f"INSERT INTO TenPrints (name) VALUES ('{entryName}')")
cur.execute(f"SELECT id FROM TenPrints WHERE (name='{entryName}')")
```

- In the above example, “entryName” is already filled by user input that was prompted prior to the example commands

Resources

- MariaDB
  https://mariadb.com
- MariaDB Training and Tutorials
  https://mariadb.com/kb/en/training-tutorials/
- How to connect Python programs to MariaDB
  https://mariadb.com/resources/blog/how-to-connect-python-programs-to-mariadb/

Activity

- Please complete the Database Tables and Python Exercise