

# MySQL on Mac w/ Python

This is a how-to on installing [MySQL](#), creating a simple database, and interacting with it through [Python](#).

## Create a MySQL database from a .CSV file

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The .CSV is exported from [pioneers.computer](#). It is based on the [Wikipedia list of pioneers in computer science](#). Here are the steps to follow:

- Install [MySQL](#) (I use [Homebrew](#)).

```
dcp:~/work/mysql-example$ brew install mysql # already installed!
```

```
Warning: mysql 8.0.21 is already installed and up-to-date
To reinstall 8.0.21, run `brew reinstall mysql`
```

- Start the [MySQL](#) server.

```
dcp:~/work/mysql-example$ mysql.server start
```

```
Starting MySQL
.. SUCCESS!
```

- Create the `'mysql'@'localhost'` user, granting all privileges.

```
dcp:~/work/mysql-example$ sudo mysql
```

```
Password:
```

```
Welcome to the MySQL monitor.  Commands end with ; or \g.  
Your MySQL connection id is 9  
Server version: 8.0.21 Homebrew
```

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

```
mysql> CREATE USER 'mysql'@'localhost' IDENTIFIED BY 'mysql';  
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> GRANT ALL PRIVILEGES ON *.* TO 'mysql'@'localhost';  
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> FLUSH PRIVILEGES;  
Query OK, 0 rows affected (0.00 sec)
```

- Include a `~/.my.cnf` file so that `LOAD DATA INFILE` will work.

```
dcp:~/work/mysql-example$ cat ~/.my.cnf
```

```
[mysqld]  
secure_file_priv = ''
```

- Create the database, table, and load the .CSV data w/ the following .SQL file.

```
dcp:~/work/mysql-example$ cat src/mysql.sql
```

```

CREATE DATABASE IF NOT EXISTS test;
USE test;

DROP TABLE IF EXISTS pioneers;
CREATE TABLE pioneers (
    last_name VARCHAR(255) NOT NULL,
    first_name VARCHAR(255) NULL,
    sex CHAR(1) NOT NULL,
    first_year SMALLINT NOT NULL,
    email_school VARCHAR(255) NOT NULL,
    email_gmail VARCHAR(255) NOT NULL
);

LOAD DATA INFILE '~/work/mysql-example/data/pioneers.computer.csv'
    INTO TABLE pioneers
    FIELDS TERMINATED BY ','
    ENCLOSED BY '"'
    LINES TERMINATED BY '\r\n'
    IGNORE 1 ROWS;

SHOW TABLES;
SHOW COLUMNS FROM pioneers;
SELECT * FROM pioneers WHERE sex = "F";

```

```

dcp:~/work/mysql-example$ cat data/pioneers.computer.csv

```

```

First,Last,Sex,Year1,E-mail,G-Mail
Leonard,Adleman,M,1977,LeonardAdleman@pioneers.computer,"""Leonard Adlema
n"" <LeonardAdleman@pioneers.computer>,"
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```

```
dcp:~/work/mysql-example$ mysql -u mysql -p < src/mysql.sql
```

```
Enter password:
```

```

Tables_in_test
pioneers
Field    Type      Null      Key  Default  Extra
first_name  varchar(255)  YES      NULL
last_name   varchar(255)  NO       NULL
sex char(1) NO      NULL
first_year  smallint      NO      NULL

```

```

email_school    varchar(255)    NO        NULL
email_gmail     varchar(255)    NO        NULL
first_name      last_name      sex first_year email_school email_gmail
Frances Allen   F    1970      FrancesAllen@pioneers.computer "Frances Allen" <FrancesAllen@pioneers.computer>,
Kathleen Booth F    1947      KathleenBooth@pioneers.computer "Kathleen Booth" <KathleenBooth@pioneers.computer>,
Lynn Conway   F    1971      LynnConway@pioneers.computer   "Lynn Conway" <LynnConway@pioneers.computer>,
Elizabeth Feinler F    1974      ElizabethFeinler@pioneers.computer "Elizabeth Feinler" <ElizabethFeinler@pioneers.computer>,
Sally Floyd    F    1994      SallyFloyd@pioneers.computer   "Sally Floyd" <SallyFloyd@pioneers.computer>,
Shafi Goldwasser F    1989      ShafiGoldwasser@pioneers.computer "Shafi Goldwasser" <ShafiGoldwasser@pioneers.computer>,
Susan Graham   F    2011      SusanGraham@pioneers.computer   "Susan Graham" <SusanGraham@pioneers.computer>,
Barbara Grosz  F    1986      BarbaraGrosz@pioneers.computer   "Barbara Grosz" <BarbaraGrosz@pioneers.computer>,
Margaret Hamilton F    1971      MargaretHamilton@pioneers.computer "Margaret Hamilton" <MargaretHamilton@pioneers.computer>,
Betty Holberton F    1968      BettyHolberton@pioneers.computer "Betty Holberton" <BettyHolberton@pioneers.computer>,
Grace Hopper   F    1952      GraceHopper@pioneers.computer   "Grace Hopper" <GraceHopper@pioneers.computer>,
Barbara Liskov F    1987      BarbaraLiskov@pioneers.computer "Barbara Liskov" <BarbaraLiskov@pioneers.computer>,
Ada Lovelace    F    1852      AdaLovelace@pioneers.computer   "Ada Lovelace" <AdaLovelace@pioneers.computer>,
Radia Perlman  F    1985      RadiaPerlman@pioneers.computer   "Radia Perlman" <RadiaPerlman@pioneers.computer>,
Rózsa Péter    F    1932      RózsaPéter@pioneers.computer   "Rózsa Péter" <RózsaPéter@pioneers.computer>,
Rosalind Picard F    1995      RosalindPicard@pioneers.computer "Rosalind Picard" <RosalindPicard@pioneers.computer>,
Jean Sammet     F    1962      JeanSammet@pioneers.computer   "Jean Sammet" <JeanSammet@pioneers.computer>,
Karen Spärck Jones F    1953      KarenSpärckJones@pioneers.computer "Karen Spärck Jones" <KarenSpärckJones@pioneers.computer>,
Sophie Wilson   F    1985      SophieWilson@pioneers.computer   "Sophie Wilson" <SophieWilson@pioneers.computer>,

```

- Read this link to understand how to [import / export](#) as .XML. For example:

```
dcp:~/work/mysql-example$
```

```
mysql -u mysql -p --xml -e 'SELECT * FROM test.pioneers WHERE sex = "F";'
```

```
Enter password :
```

```
<?xml version="1.0"?>

<resultset statement="SELECT * FROM test.pioneers WHERE sex = &quot;F&quot;
t;" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <row>
    <field name="first_name">Frances</field>
    <field name="last_name">Allen</field>
    <field name="sex">F</field>
    <field name="first_year">1970</field>
    <field name="email_school">FrancesAllen@pioneers.computer</field>
    <field name="email_gmail">&quot;Frances Allen&quot; &lt;FrancesAllen@
pioneers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Kathleen</field>
    <field name="last_name">Booth</field>
    <field name="sex">F</field>
    <field name="first_year">1947</field>
    <field name="email_school">KathleenBooth@pioneers.computer</field>
    <field name="email_gmail">&quot;Kathleen Booth&quot; &lt;KathleenBooth@
pioneers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Lynn</field>
    <field name="last_name">Conway</field>
    <field name="sex">F</field>
    <field name="first_year">1971</field>
    <field name="email_school">LynnConway@pioneers.computer</field>
    <field name="email_gmail">&quot;Lynn Conway&quot; &lt;LynnConway@pion
eers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Elizabeth</field>
    <field name="last_name">Feinler</field>
    <field name="sex">F</field>
    <field name="first_year">1974</field>
    <field name="email_school">ElizabethFeinler@pioneers.computer</field>
    <field name="email_gmail">&quot;Elizabeth Feinler&quot; &lt;Elizabeth
Feinler@pioneers.computer&gt;,</field>
```

```

</row>

<row>
  <field name="first_name">Sally</field>
  <field name="last_name">Floyd</field>
  <field name="sex">F</field>
  <field name="first_year">1994</field>
  <field name="email_school">SallyFloyd@pioneers.computer</field>
  <field name="email_gmail">&quot;Sally Floyd&quot; &lt;SallyFloyd@pion
eers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Shafi</field>
  <field name="last_name">Goldwasser</field>
  <field name="sex">F</field>
  <field name="first_year">1989</field>
  <field name="email_school">ShafiGoldwasser@pioneers.computer</field>
  <field name="email_gmail">&quot;Shafi Goldwasser&quot; &lt;ShafiGoldw
asser@pioneers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Susan</field>
  <field name="last_name">Graham</field>
  <field name="sex">F</field>
  <field name="first_year">2011</field>
  <field name="email_school">SusanGraham@pioneers.computer</field>
  <field name="email_gmail">&quot;Susan Graham&quot; &lt;SusanGraham@pi
oneers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Barbara</field>
  <field name="last_name">Grosz</field>
  <field name="sex">F</field>
  <field name="first_year">1986</field>
  <field name="email_school">BarbaraGrosz@pioneers.computer</field>
  <field name="email_gmail">&quot;Barbara Grosz&quot; &lt;BarbaraGrosz@
pioneers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Margaret</field>
  <field name="last_name">Hamilton</field>

```

```

    <field name="sex">F</field>
    <field name="first_year">1971</field>
    <field name="email_school">MargaretHamilton@pioneers.computer</field>
    <field name="email_gmail">&quot;Margaret Hamilton&quot; &lt;MargarethH
amilton@pioneers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Betty</field>
    <field name="last_name">Holberton</field>
    <field name="sex">F</field>
    <field name="first_year">1968</field>
    <field name="email_school">BettyHolberton@pioneers.computer</field>
    <field name="email_gmail">&quot;Betty Holberton&quot; &lt;BettyHolber
ton@pioneers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Grace</field>
    <field name="last_name">Hopper</field>
    <field name="sex">F</field>
    <field name="first_year">1952</field>
    <field name="email_school">GraceHopper@pioneers.computer</field>
    <field name="email_gmail">&quot;Grace Hopper&quot; &lt;GraceHopper@pi
oneers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Barbara</field>
    <field name="last_name">Liskov</field>
    <field name="sex">F</field>
    <field name="first_year">1987</field>
    <field name="email_school">BarbaraLiskov@pioneers.computer</field>
    <field name="email_gmail">&quot;Barbara Liskov&quot; &lt;BarbaraLisko
v@pioneers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Ada</field>
    <field name="last_name">Lovelace</field>
    <field name="sex">F</field>
    <field name="first_year">1852</field>
    <field name="email_school">AdaLovelace@pioneers.computer</field>
    <field name="email_gmail">&quot;Ada Lovelace&quot; &lt;AdaLovelace@pi
oneers.computer&gt;,</field>

```

```

</row>

<row>
  <field name="first_name">Radia</field>
  <field name="last_name">Perlman</field>
  <field name="sex">F</field>
  <field name="first_year">1985</field>
  <field name="email_school">RadiaPerlman@pioneers.computer</field>
  <field name="email_gmail">&quot;Radia Perlman&quot; &lt;RadiaPerlman@
pioneers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Rózsa</field>
  <field name="last_name">Péter</field>
  <field name="sex">F</field>
  <field name="first_year">1932</field>
  <field name="email_school">RózsaPéter@pioneers.computer</field>
  <field name="email_gmail">&quot;Rózsa Péter&quot; &lt;RózsaPéter@pion
eers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Rosalind</field>
  <field name="last_name">Picard</field>
  <field name="sex">F</field>
  <field name="first_year">1995</field>
  <field name="email_school">RosalindPicard@pioneers.computer</field>
  <field name="email_gmail">&quot;Rosalind Picard&quot; &lt;RosalindPic
ard@pioneers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Jean</field>
  <field name="last_name">Sammet</field>
  <field name="sex">F</field>
  <field name="first_year">1962</field>
  <field name="email_school">JeanSammet@pioneers.computer</field>
  <field name="email_gmail">&quot;Jean Sammet&quot; &lt;JeanSammet@pion
eers.computer&gt;;,</field>
</row>

<row>
  <field name="first_name">Karen</field>
  <field name="last_name">Spärck Jones</field>

```

```

    <field name="sex">F</field>
    <field name="first_year">1953</field>
    <field name="email_school">KarenSpärckJones@pioneers.computer</field>
    <field name="email_gmail">"Karen Spärck Jones" &lt;KarenSpä
rckJones@pioneers.computer&gt;,</field>
  </row>

  <row>
    <field name="first_name">Sophie</field>
    <field name="last_name">Wilson</field>
    <field name="sex">F</field>
    <field name="first_year">1985</field>
    <field name="email_school">SophieWilson@pioneers.computer</field>
    <field name="email_gmail">"Sophie Wilson" &lt;SophieWilson@
pioneers.computer&gt;,</field>
  </row>
</resultset>

```

## Access a MySQL database through Python

- Add the `mysql-connector-python` through [pip3](#).

```
dcp:~/work/mysql-example$
```

```
pip3 install mysql-connector-python # already installed!
```

```

Requirement already satisfied: mysql-connector-python in /usr/local/lib/p
ython3.8/site-packages (8.0.21)
Requirement already satisfied: protobuf>=3.0.0 in /usr/local/Cellar/proto
buf/3.12.3/libexec/lib/python3.8/site-packages (from mysql-connector-pyth
on) (3.12.3)
Requirement already satisfied: six>=1.9 in /usr/local/Cellar/protobuf/3.1
2.3/libexec/lib/python3.8/site-packages (from protobuf>=3.0.0->mysql-conn
ector-python) (1.15.0)
Requirement already satisfied: setuptools in /usr/local/lib/python3.8/sit
e-packages (from protobuf>=3.0.0->mysql-connector-python) (49.2.0)

```

- Test [MySQL](#) access through the following [Python](#) file.

```
dcp:~/work/mysql-example$ cat src/testmysql.py
```



```
#!/usr/bin/env python3

#

# testmysql.py

#

# pip3 install mysql-connector-python

#

import mysql.connector

config = {
    'user': 'mysql',
    'password': 'mysql',
    'host': '127.0.0.1',
    'database': 'test',
}
cnx = mysql.connector.connect(**config)
cursor = cnx.cursor()
cursor.execute('SELECT * FROM pioneers WHERE sex = "F";')
for record in cursor:
    print(record)
cnx.close()
```

```
dcp:~/work/mysql-example$ python3 src/testmysql.py
```

```
( 'Frances', 'Allen', 'F', 1970, 'FrancesAllen@pioneers.computer', '"Franc
es Allen" <FrancesAllen@pioneers.computer>,' )
( 'Kathleen', 'Booth', 'F', 1947, 'KathleenBooth@pioneers.computer', '"Kat
hleen Booth" <KathleenBooth@pioneers.computer>,' )
( 'Lynn', 'Conway', 'F', 1971, 'LynnConway@pioneers.computer', '"Lynn Conw
ay" <LynnConway@pioneers.computer>,' )
( 'Elizabeth', 'Feinler', 'F', 1974, 'ElizabethFeinler@pioneers.computer',
'"Elizabeth Feinler" <ElizabethFeinler@pioneers.computer>,' )
( 'Sally', 'Floyd', 'F', 1994, 'SallyFloyd@pioneers.computer', '"Sally Flo
yd" <SallyFloyd@pioneers.computer>,' )
( 'Shafi', 'Goldwasser', 'F', 1989, 'ShafiGoldwasser@pioneers.computer', '
"Shafi Goldwasser" <ShafiGoldwasser@pioneers.computer>,' )
( 'Susan', 'Graham', 'F', 2011, 'SusanGraham@pioneers.computer', '"Susan G
raham" <SusanGraham@pioneers.computer>,' )
( 'Barbara', 'Grosz', 'F', 1986, 'BarbaraGrosz@pioneers.computer', '"Barba
ra Grosz" <BarbaraGrosz@pioneers.computer>,' )
( 'Margaret', 'Hamilton', 'F', 1971, 'MargaretHamilton@pioneers.computer',
'"Margaret Hamilton" <MargaretHamilton@pioneers.computer>,' )
( 'Betty', 'Holberton', 'F', 1968, 'BettyHolberton@pioneers.computer', '"B
etty Holberton" <BettyHolberton@pioneers.computer>,' )
( 'Grace', 'Hopper', 'F', 1952, 'GraceHopper@pioneers.computer', '"Grace H
opper" <GraceHopper@pioneers.computer>,' )
( 'Barbara', 'Liskov', 'F', 1987, 'BarbaraLiskov@pioneers.computer', '"Bar
bara Liskov" <BarbaraLiskov@pioneers.computer>,' )
( 'Ada', 'Lovelace', 'F', 1852, 'AdaLovelace@pioneers.computer', '"Ada Lov
elace" <AdaLovelace@pioneers.computer>,' )
( 'Radia', 'Perlman', 'F', 1985, 'RadiaPerlman@pioneers.computer', '"Radia
Perlman" <RadiaPerlman@pioneers.computer>,' )
( 'Rózsa', 'Péter', 'F', 1932, 'RózsaPéter@pioneers.computer', '"Rózsa Pé
ter" <RózsaPéter@pioneers.computer>,' )
( 'Rosalind', 'Picard', 'F', 1995, 'RosalindPicard@pioneers.computer', '"R
osalind Picard" <RosalindPicard@pioneers.computer>,' )
( 'Jean', 'Sammet', 'F', 1962, 'JeanSammet@pioneers.computer', '"Jean Samm
et" <JeanSammet@pioneers.computer>,' )
( 'Karen', 'Spärck Jones', 'F', 1953, 'KarenSpärckJones@pioneers.computer'
, '"Karen Spärck Jones" <KarenSpärckJones@pioneers.computer>,' )
( 'Sophie', 'Wilson', 'F', 1985, 'SophieWilson@pioneers.computer', '"Sophi
e Wilson" <SophieWilson@pioneers.computer>,' )
```

## Notes

- This how-to assumes:
  - [Mac OS Homebrew](#) is installed (and `brew upgrade python` has been executed

to get the latest versions of `python3` and `pip3` ). There are many other ways to install [Python](#) & [MySQL](#) — this is just the easiest one.

- The `zsh` commands (in green) are executed from `~/work/mysql-example` — which includes the files: `README.md` (this file),  
`data/pioneers.computer.csv` , `doc/mysql.pdf` , `src/mysql.sql` ,  
`src/testmysql.py` .
- [SQL](#) can be a bit fussy.
  - By convention, SQL commands are in UPPERCASE, other text is in appropriate mixed case.
  - The  

```
LOAD DATA INFILE '~/work/mysql-example/pioneers.computer.csv' ...
```

command requires an absolute (glob-pattern) path, the proper line termination (in this case `'\r\n'` ), no blank / extra lines, and every field present that is marked `NOT NULL` .
- Every `SELECT` in this example ends with `WHERE sex = "F"` , *which is not the entire database*. There are 19 women pioneers out of 160 in this database, which limits the output to one ninth of it's potential total length for the purposes of this document.
- The [Python](#) `mysql.connector` module exists in several versions and it took a bit to find the correct one for Python 3. (Also, *do not name your Python file* `mysql.py` or you will have trouble importing the `mysql` module you expect.)
- *This test is not secure.*
  - The MySQL user  

```
CREATE USER 'mysql'@'localhost' IDENTIFIED BY 'mysql';
```

with an easy-to-guess password is a terrible idea.
  - Allowing direct local import of data through a `~/.my.cnf` file is good for local testing, but not secure in a deployed system.
  - Having `'password': 'mysql'` , as a key:value pair in the Python code is also not a good idea.

Have fun!