

## Use Case: Writing SQL in Tableau

This is the **Tableau SQL Use Case** assignment option for CSIS-1550.

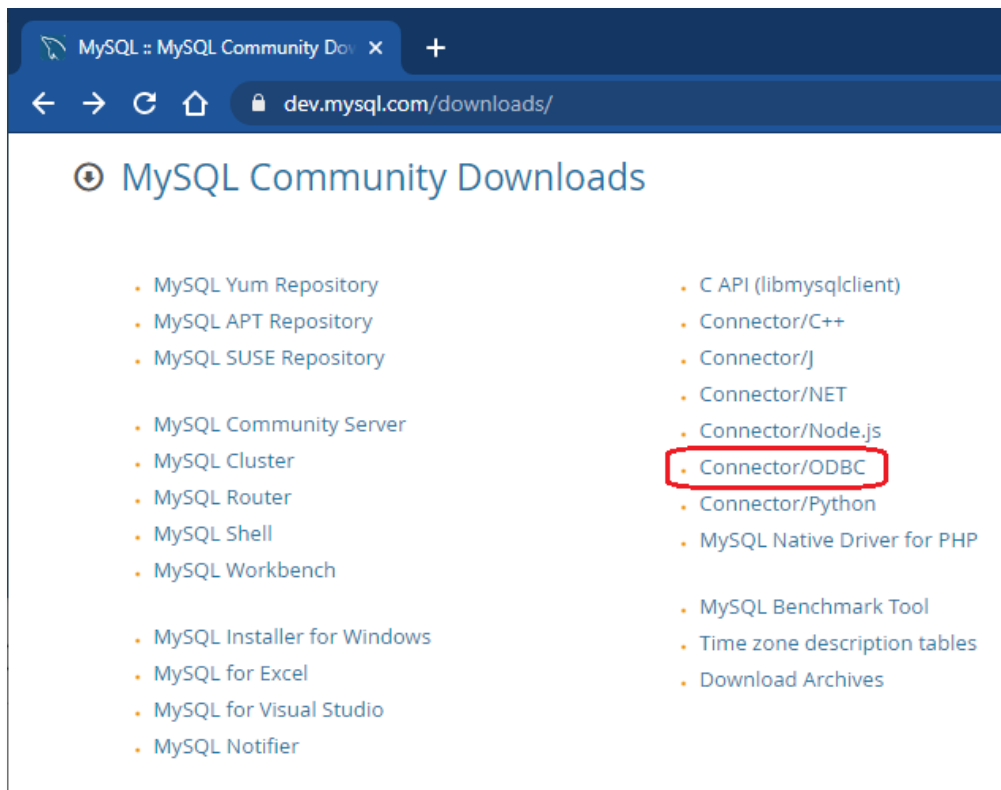
Tableau is an interactive data visualization software that transforms data into actionable insights. In common terms, Tableau takes in data and converts that data into visual representations of the data to help people make observations and draw conclusions based on those visualizations.

Follow the instructions in Canvas to prepare for this assignment option and then carefully follow the instructions below. **There are two screen captures for you to capture while you work through these instructions that you will submit for your assignment (pages 18 and 22 in these instructions).**

**Scenario:** In this walk-through we will learn how to connect to MySQL from Tableau so that we can write a query inside of Tableau to extract data from the database for display and manipulation inside of Tableau.

- **Acquire, download and install Tableau Desktop**
  - a. You will need a copy of **Tableau Desktop** on the computer where you have MySQL and MySQL Workbench installed. As a student you can get a **free copy** of **Tableau** by going to the following web address and filling out a request form:  
<https://www.tableau.com/academic/students>.
  - b. When you get a response from Tableau and can download the software, do so and install it on your computer.

- Next, we need to add a tool called a connector from Oracle for our MySQL database.
- Go to <https://dev.mysql.com/downloads/>
- And click the **Connector/ODBC** link ...



- On the next page select the appropriate item in the **Other Downloads** list and click the associated **Download** button.
- If you have a Windows computer set the **Operating System** dropdown to Windows, or MacOS if you have a Mac, or select the version of Linux you have if you have a Linux computer.
- For the following example, I'll use Windows for demonstration:

MySQL :: Download Connector/C x +

dev.mysql.com/downloads/connector/odbc/

## MySQL Community Downloads

Connector/ODBC

General Availability (GA) Releases Archives



### Connector/ODBC 8.0.21

Select Operating System:  
 Microsoft Windows

Select OS Version:  
 All

Looking for previous GA versions?

Recommended Download:

All MySQL Products. For All Windows Platforms. In One Package.

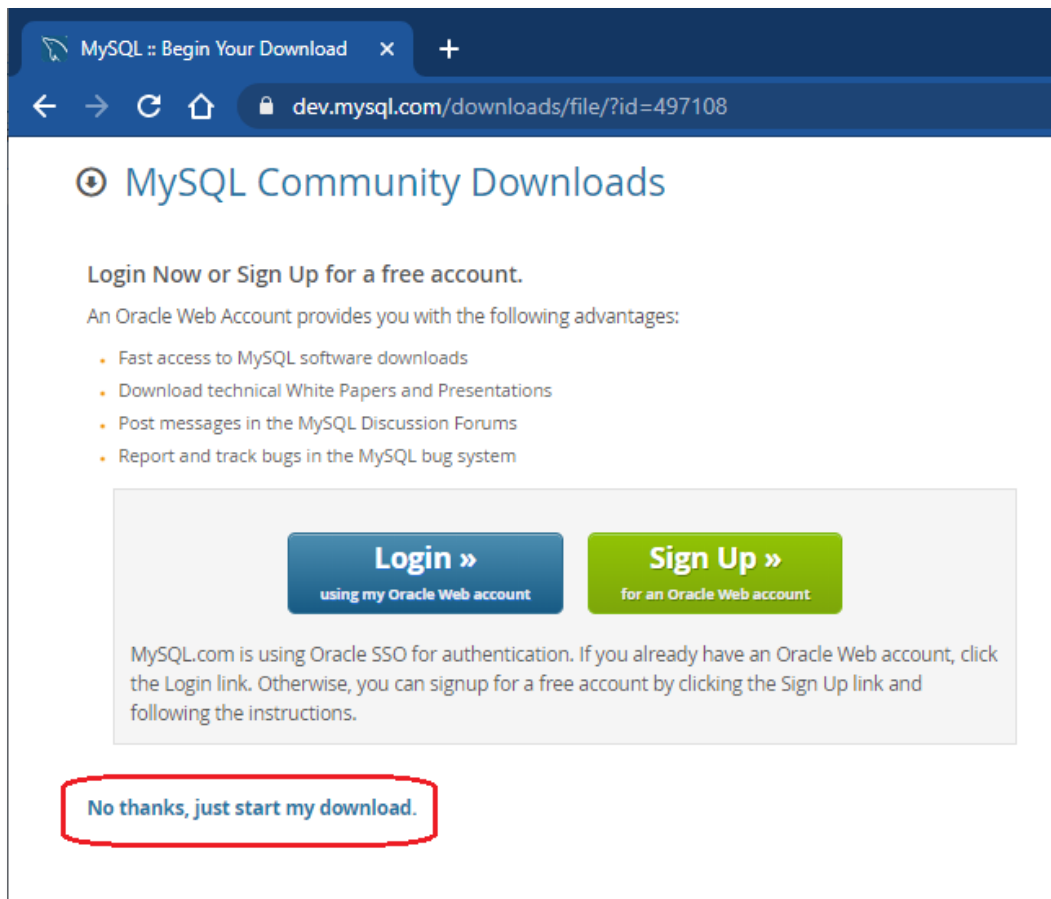
Starting with MySQL 5.6 the MySQL Installer package replaces the standalone MSI packages.

Windows (x86, 32 & 64-bit), MySQL Installer MSI [Go to Download Page >](#)

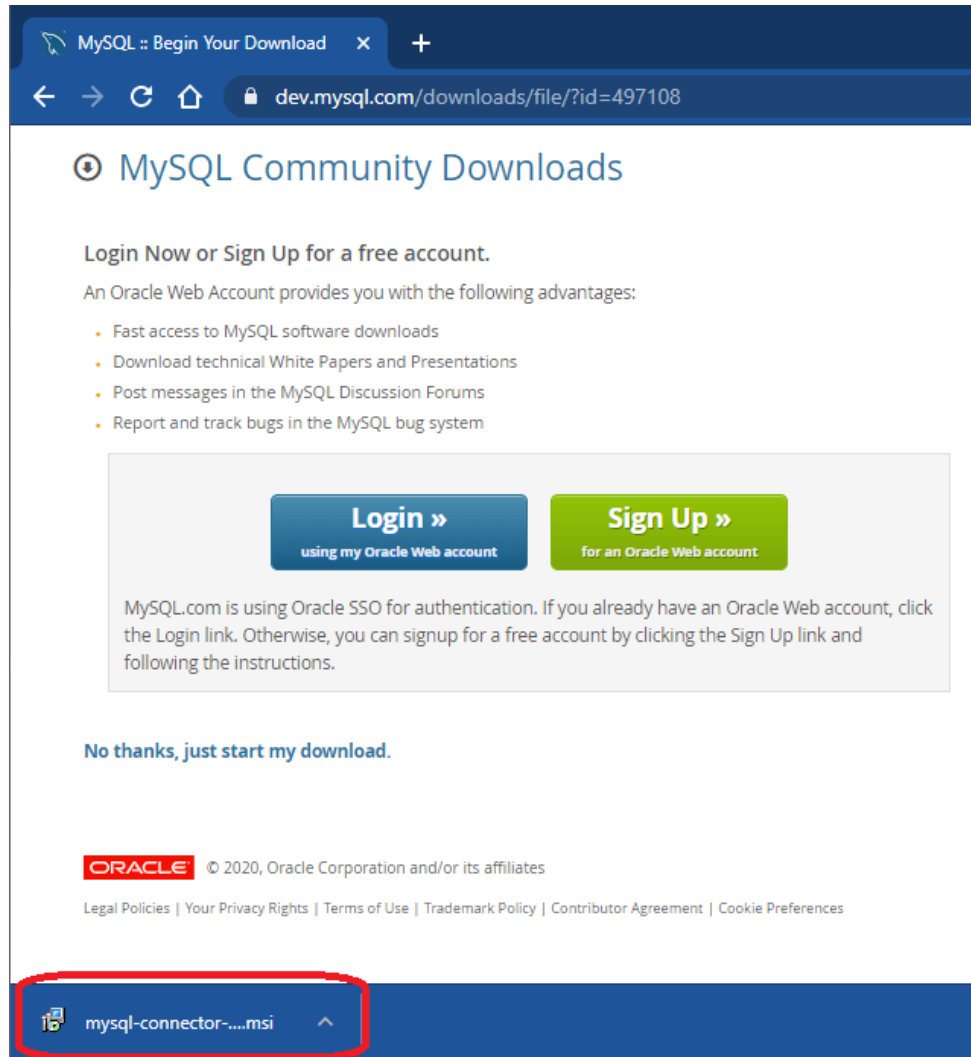
Other Downloads:

Windows (x86, 64-bit), MSI Installer (mysql-connector-odbc-8.0.21-winx64.msi)	8.0.21	14.7M	<a href="#">Download</a>
MD5: 619f771a753e7da51dbe3266e272dea3   Signature			
Windows (x86, 32-bit), MSI Installer (mysql-connector-odbc-8.0.21-win32.msi)	8.0.21	14.2M	<a href="#">Download</a>
MD5: 64df8835858d21bfe0ffe84c7ed477d0   Signature			
Windows (x86, 32-bit), ZIP Archive (mysql-connector-odbc-noinstall-8.0.21-win32.zip)	8.0.21	14.0M	<a href="#">Download</a>
MD5: 2cce435bf58d6bcae2492e6499552603   Signature			
Windows (x86, 64-bit), ZIP Archive (mysql-connector-odbc-noinstall-8.0.21-winx64.zip)	8.0.21	14.5M	<a href="#">Download</a>
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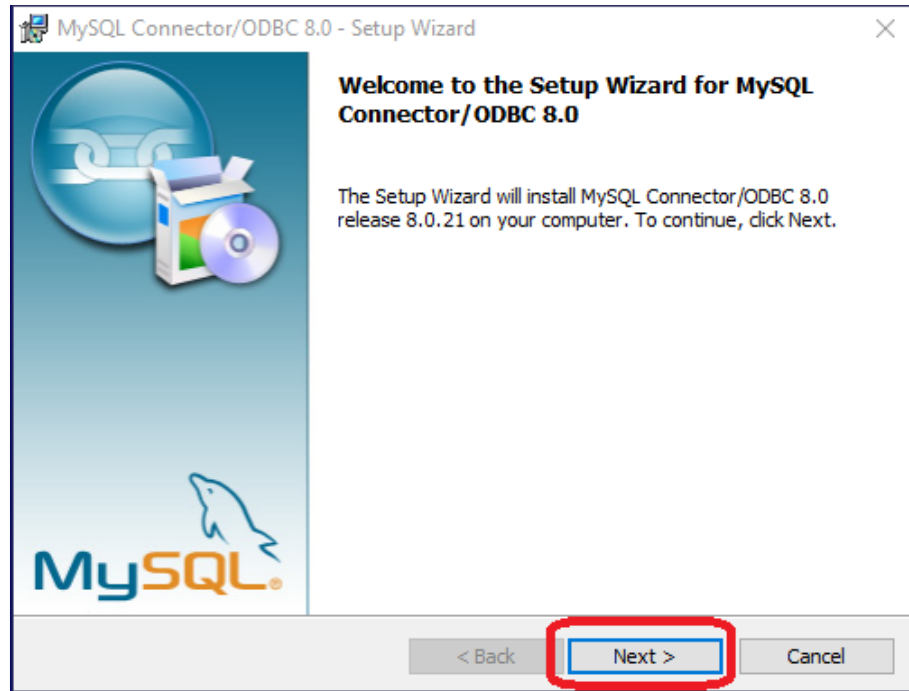
- Click the **Download** button



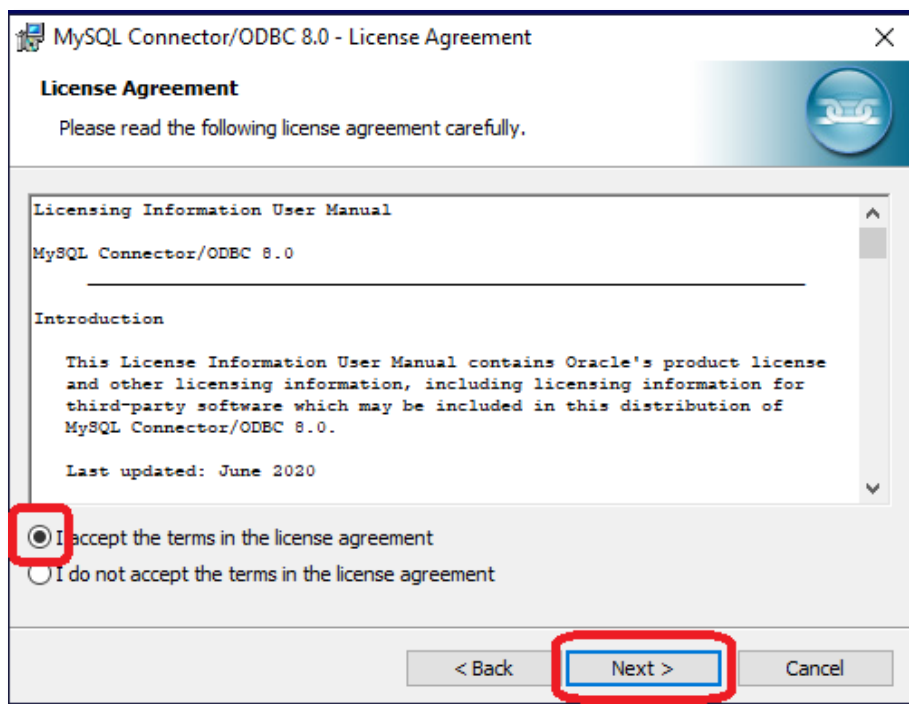
- Click the No thanks, just start my download link.
- The software will download and you should see it at the bottom left of your browser.



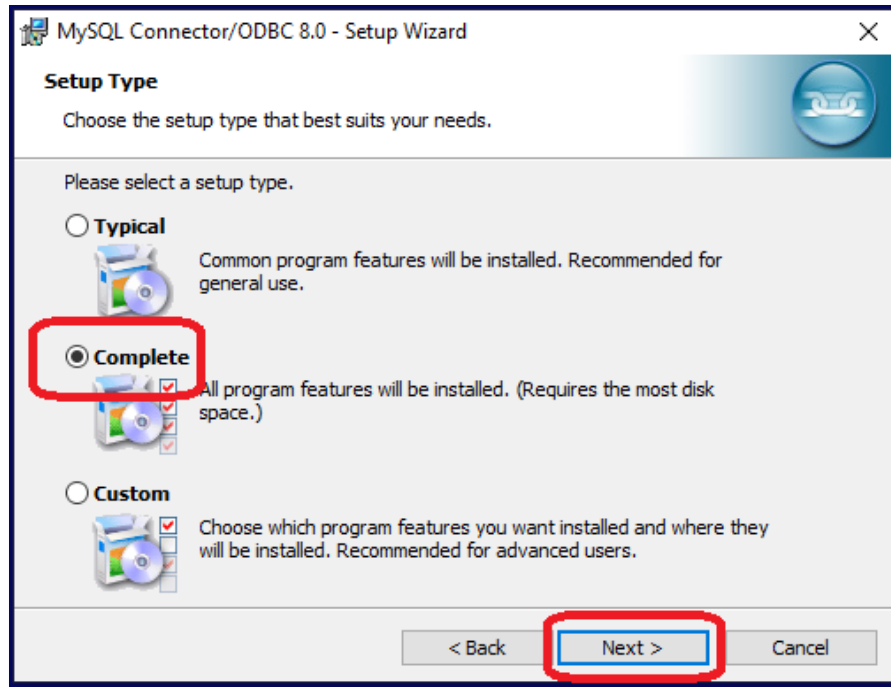
- Double-click the downloaded msi file to begin the installation.



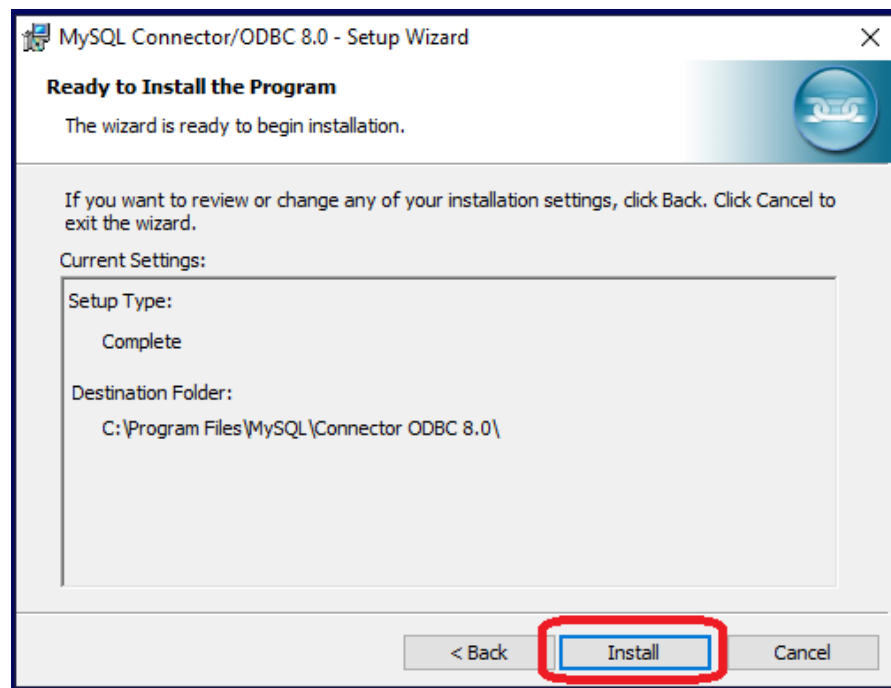
- Click the **Next** button.



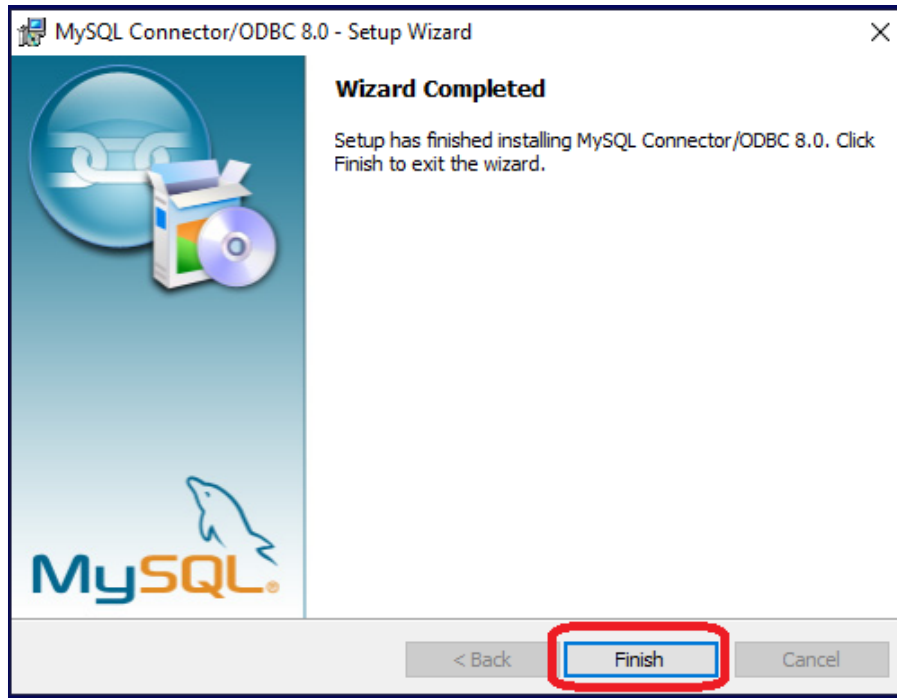
- Select the **Accept** button and then click the **Next** button.



- Click the **Complete** button and then **Next**.

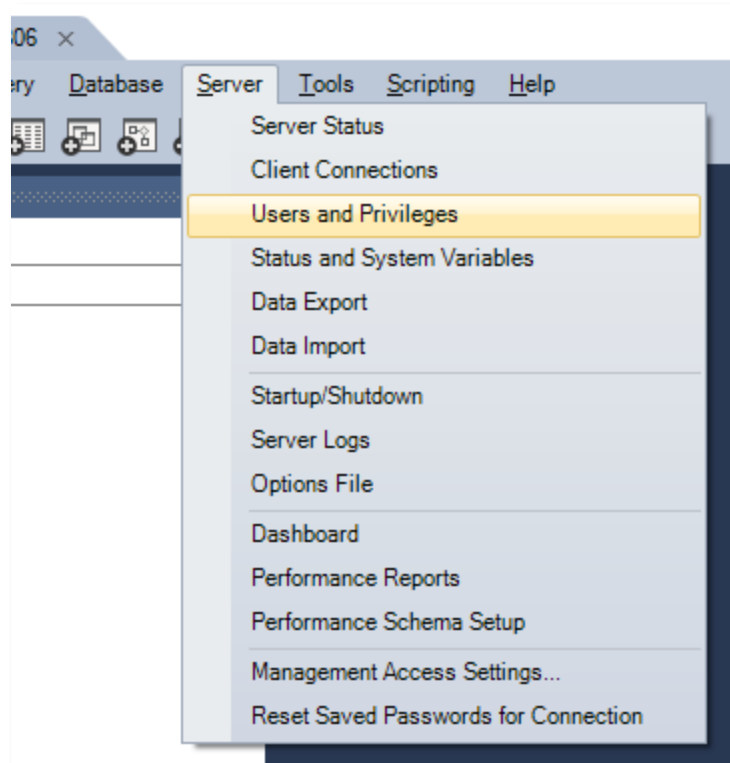


- Click the **Install** button.

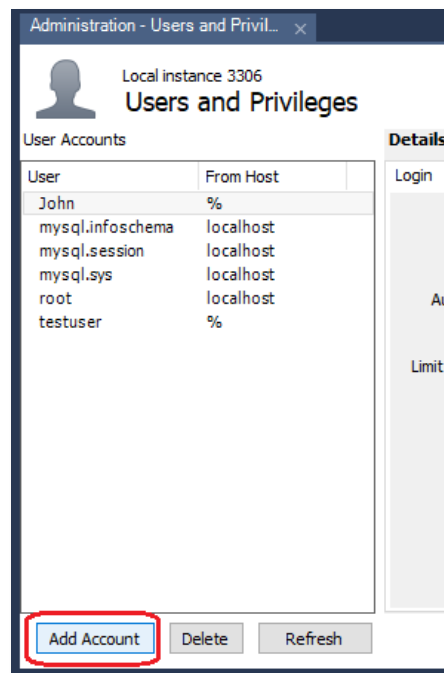


- When the installation completes click the **Finish** button.
- Next we need to create a user account in MySQL that we can use to connect to the database from Tableau.
- Open MySQL Workbench and open your local instance connection.
- Database software, such as MySQL, includes security to restrict access to the data. When an external application needs to connect to a database we often create a specific login into the database for that application so that we can control and monitor its use. We will do that here to demonstrate how database administrators set this up.
- In Workbench click the **Server** menu option and then **Users and Privileges**.





- The Users and Privileges **tab** will open.
- Click the **Add Account** button.



- As shown on the screen capture below, in the **Details for account newuser@%** area change **newuser** to a different user name, for this example I used **tableauuser**. And then enter a **Password** and **Confirm Password** (the two must match).

Administration - Users and Priv... x

Local instance 3306  
**Users and Privileges**

User Accounts

User	From Host
John	%
mysql.infoschema	localhost
mysql.session	localhost
mysql.sys	localhost
newuser	%
root	localhost
testuser	%

**Details for account newuser@%**

Login Account Limits Administrative Roles **Schema Privileges**

Login Name: **tableauuser** You may create multiple accounts with the same name to connect from different hosts.

Authentication Type: Standard For the standard password and/or host based authentication, select 'Standard'.

Limit to Hosts Matching: % % and \_ wildcards may be used

Password: \*\*\*\*\* Type a password to reset it.

Confirm Password: \*\*\*\*\* Enter password again to confirm.

Expire Password

Add Account Delete Refresh Revert Apply

- And then click the **Schema Privileges** tab.
- Click the **Add Entry ...** button.

Administration - Users and Priv... x

Local instance 3306  
**Users and Privileges**

User Accounts

User	From Host
John	%
mysql.infoschema	localhost
mysql.session	localhost
mysql.sys	localhost
newuser	%
root	localhost
testuser	%

**Details for account newuser@%**

Login Account Limits Administrative Roles **Schema Privileges**

Schema Privileges

Schema and Host fields may use % and \_ wildcards. The server will match specific entries before wildcarded ones.

Revoke All Privileges Delete Entry **Add Entry...**

Object Rights

☐ SELECT  
☐ INSERT  
☐ UPDATE  
☐ DELETE  
☐ EXECUTE

DDL Rights

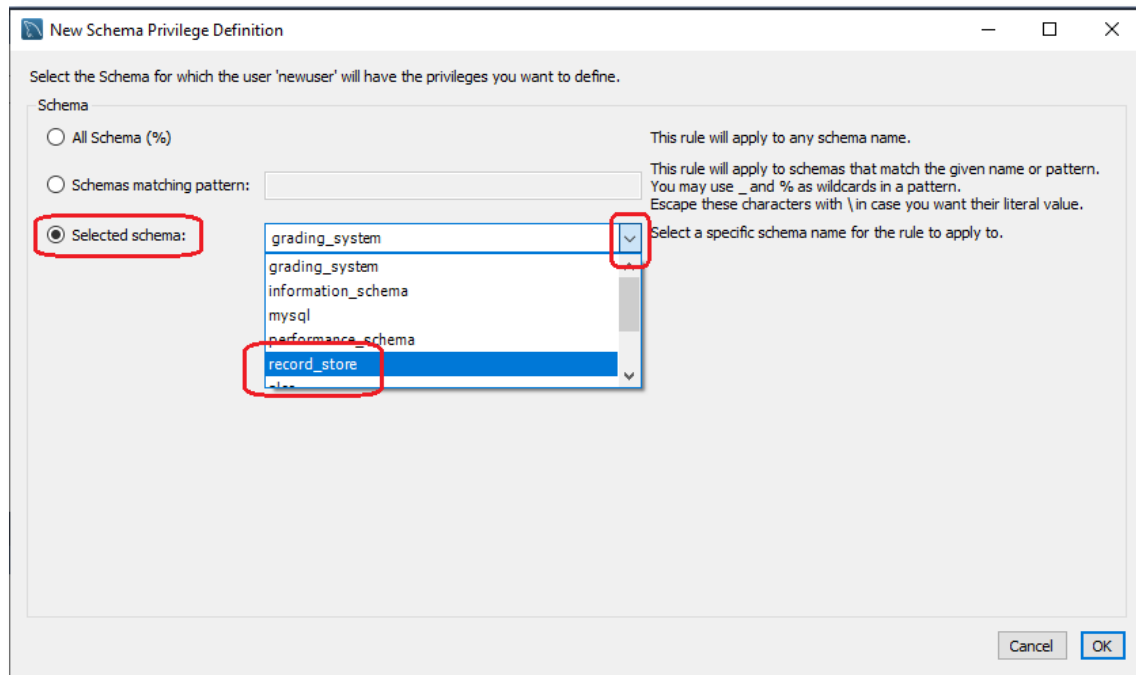
☐ CREATE  
☐ ALTER  
☐ REFERENCES  
☐ INDEX  
☐ CREATE VIEW

Other Rights

☐ GRANT OPTION  
☐ CREATE TEMPORARY TABLES  
☐ LOCK TABLES

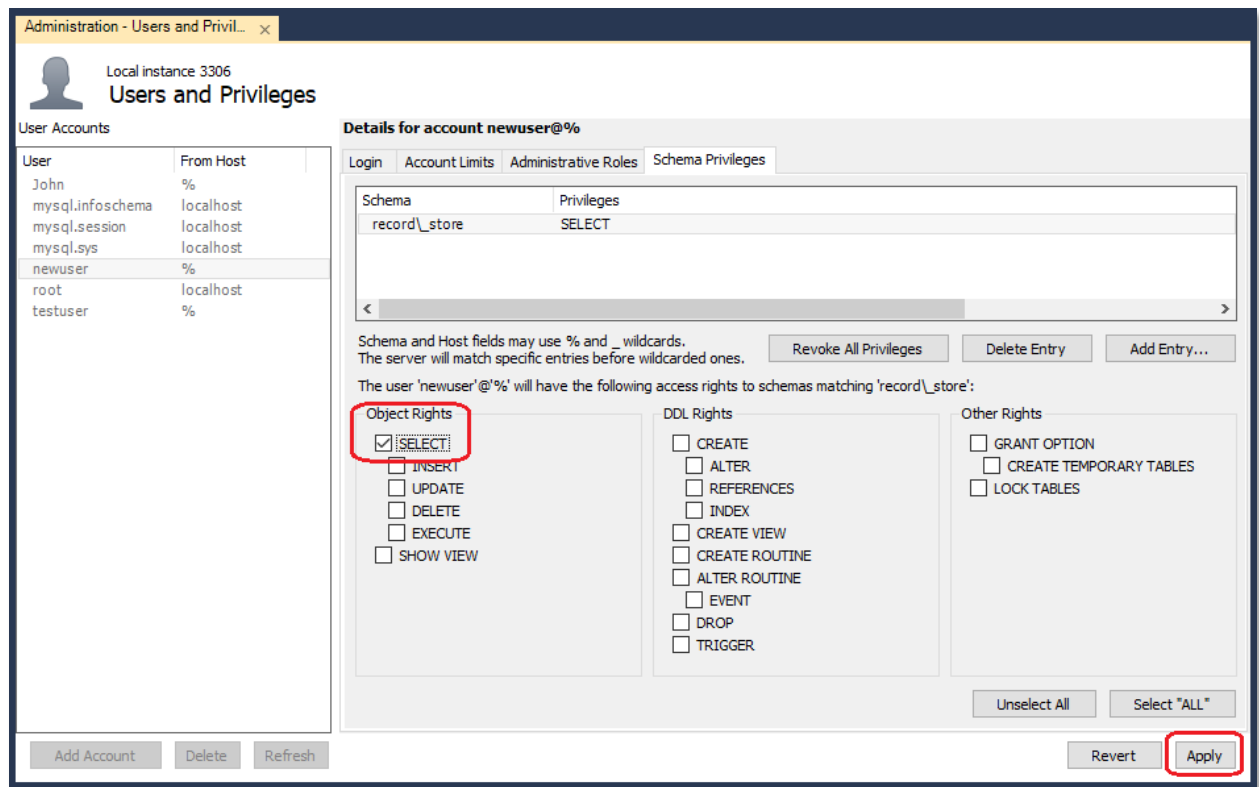
Add Account Delete Refresh Revert Apply

- On the next dialog select the **Selected Schema** button, then click the **down arrow** to drop down the list of schemas, select the **record\_store** schema and then click **Ok**.

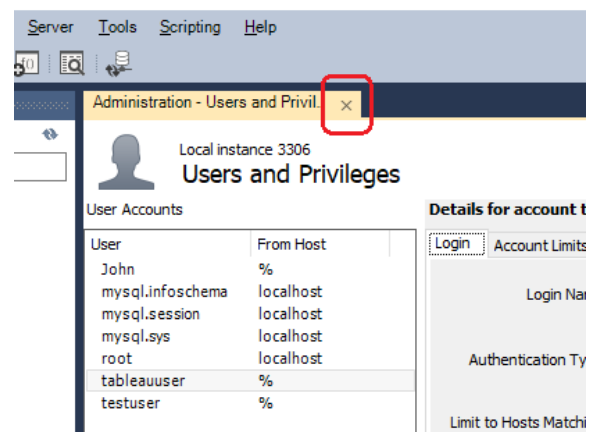


- The next dialog is where we set the specific privileges for access to the database for this new user.
- For this use case, in production systems, of accessing the database from Tableau for the purposes of running a SELECT statement to visualize the data, we would restrict access to SELECT only. This protects the database from possible changes from this user.
- So, on that next dialog we would click **SELECT** under **Object Rights** and then the **Apply** button (see the screen capture below).

- Notice also on this dialog that we can set very specific access rights for a user and that the access parallels the different types of commands we've learned (DQL, DDL, etc.).



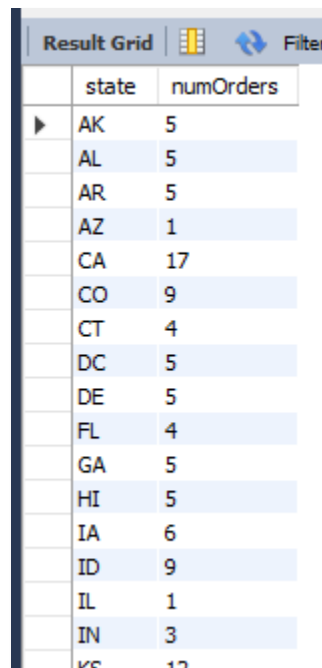
- We will use this new user login from inside of Tableau to connect to our database.
- You can close the Administration - Users and Privileges tab now.



- Next, let's write a query and test it so we know what we want to see in Tableau.
- MySQL Workbench **open** a new **SQL tab**.
- **Write** (or **Copy**) the following SQL code and **paste** it into the new SQL tab in Workbench.

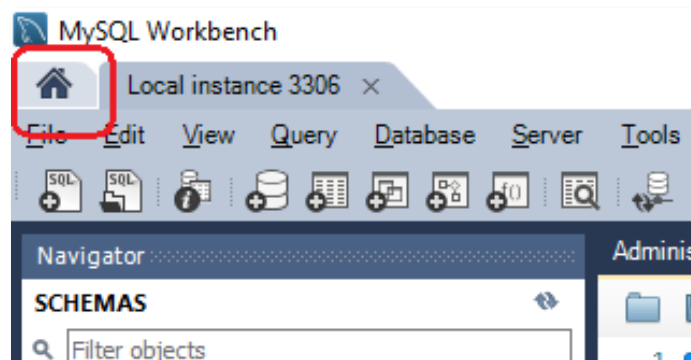
```
SELECT c.state, COUNT(o.order_id) AS numOrders
FROM customers c
INNER JOIN orders o ON c.customer_id = o.customer_id
WHERE country = "US"
GROUP BY c.state
ORDER BY c.state;
```

- **Run** the query in Workbench.
- What does this query show us? Review the query results in Workbench (see the screen capture below).

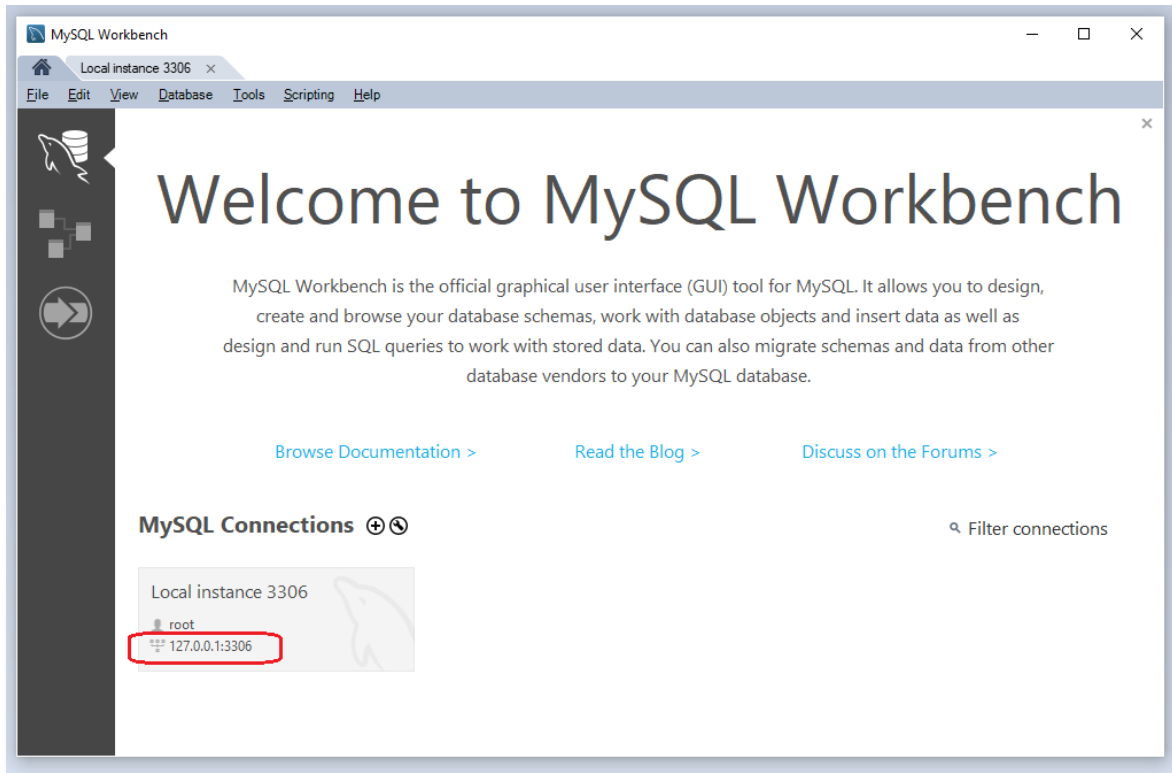


	state	numOrders
▶	AK	5
	AL	5
	AR	5
	AZ	1
	CA	17
	CO	9
	CT	4
	DC	5
	DE	5
	FL	4
	GA	5
	HI	5
	IA	6
	ID	9
	IL	1
	IN	3
	KS	12

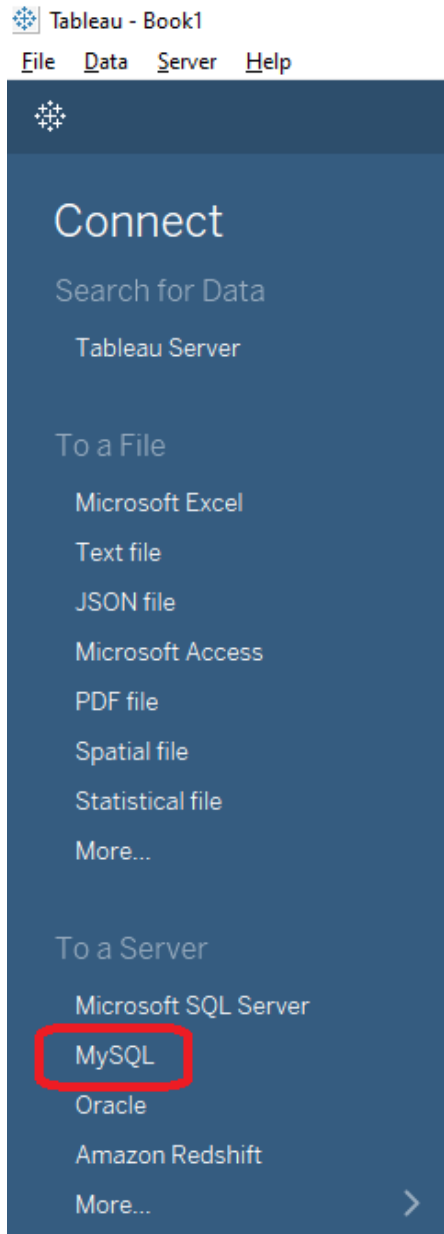
- The query provides a **summary** list of the number of orders by state.
- Let's say we want to see this result set in a **visualization** in **Tableau**.
- Orders are placed on a continuous basis so we will make a **database connection** inside of Tableau and write this query in Tableau.
- That connection will be **persistent** so any time we want to see the orders by state list, we can simply refresh the Tableau sheet and see the new summary of our orders in our visual in Tableau.
- **Get your MySQL server details**
  - We will need your MySQL **server** information. To get this information go back to **MySQL Workbench** and click the **Home** tab located at the top-left of Workbench:



- On the Workbench **Home** tab we need the **server address**, which is shown at the bottom-left of that page. This information can be different on each person's computer. In my case, mine looks the following screen capture. The **server address** that we need is circled in red (**127.0.0.1:3306**):



- Next, we're going to connect to MySQL from inside of Tableau...



- Open **Tableau Desktop**.
- You will see the Tableau **Connect** menu on the left side of the screen.

- Click the **MySQL** option under the **To a Server** section.

- You will then see the **Connection** dialog . . .



MySQL

Server: 127.0.0.1 Port: 3306

Database: record\_store

Enter information to sign in to the database:

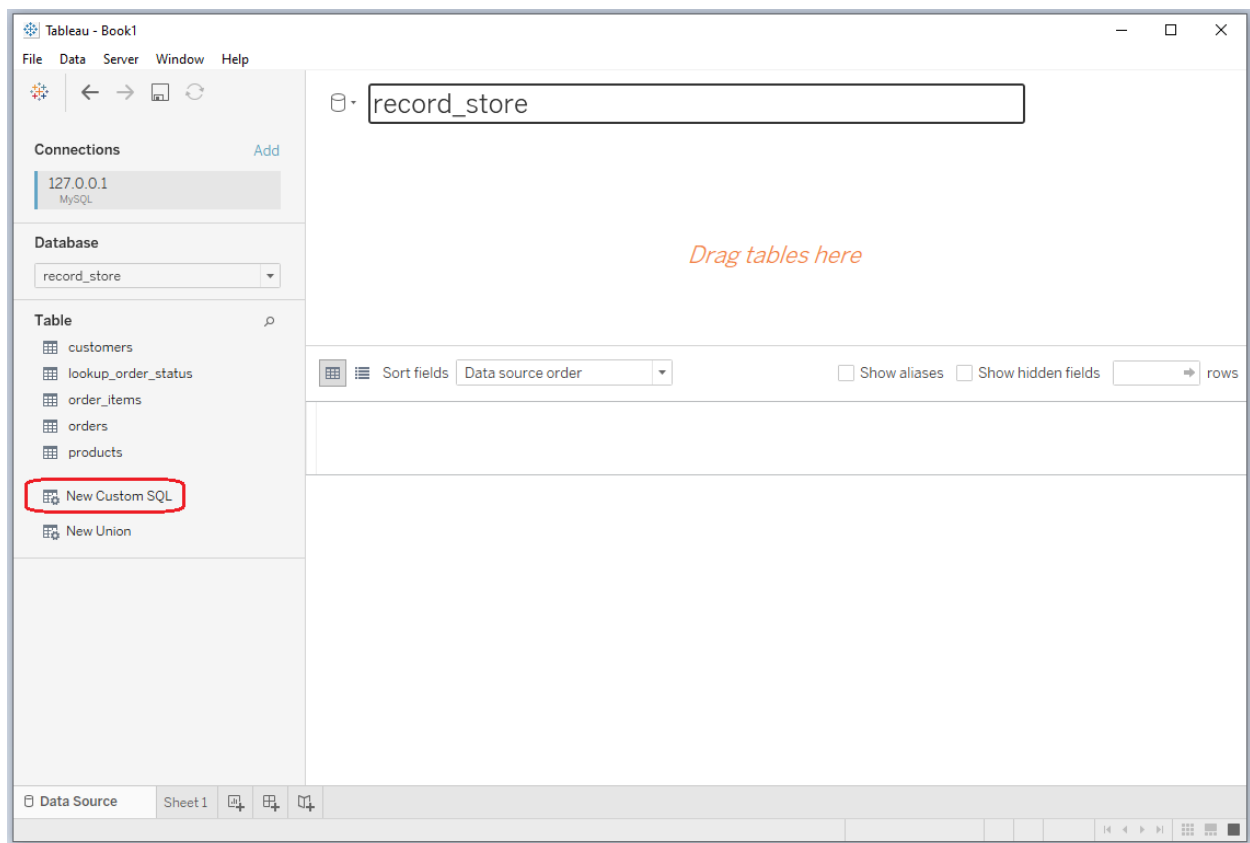
Username: tableauuser

Password: .....

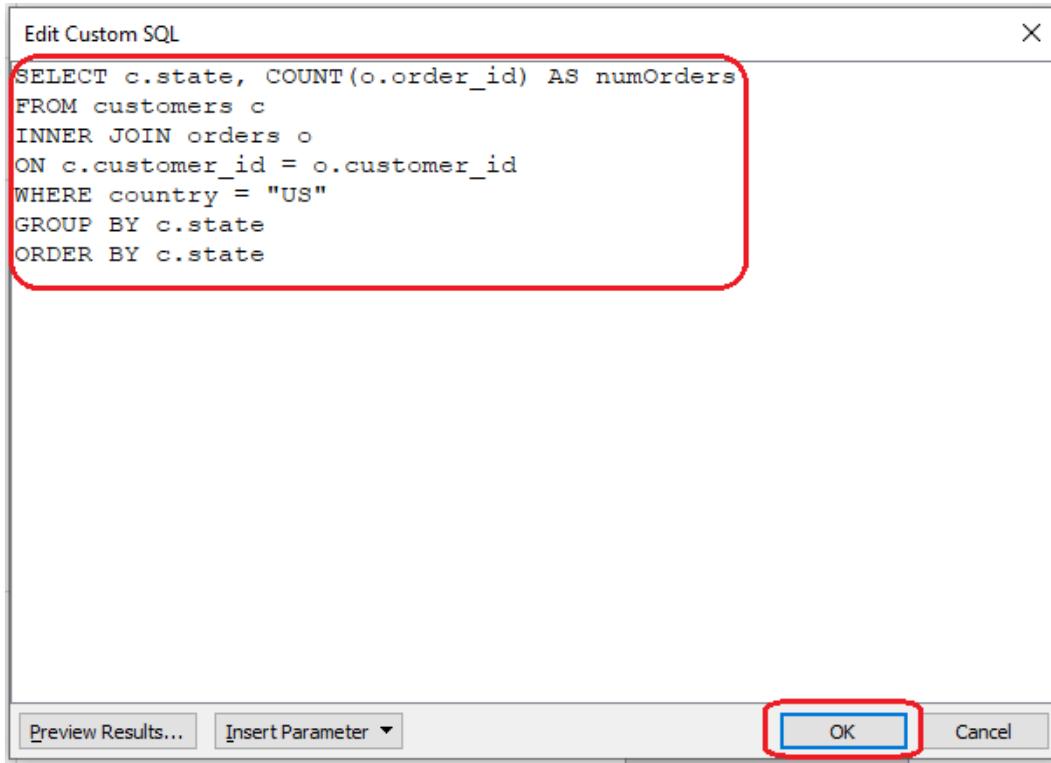
☐ Require SSL

[Initial SQL...](#) [Sign In](#)

- When the software opens click the **New Custom SQL** link . . .

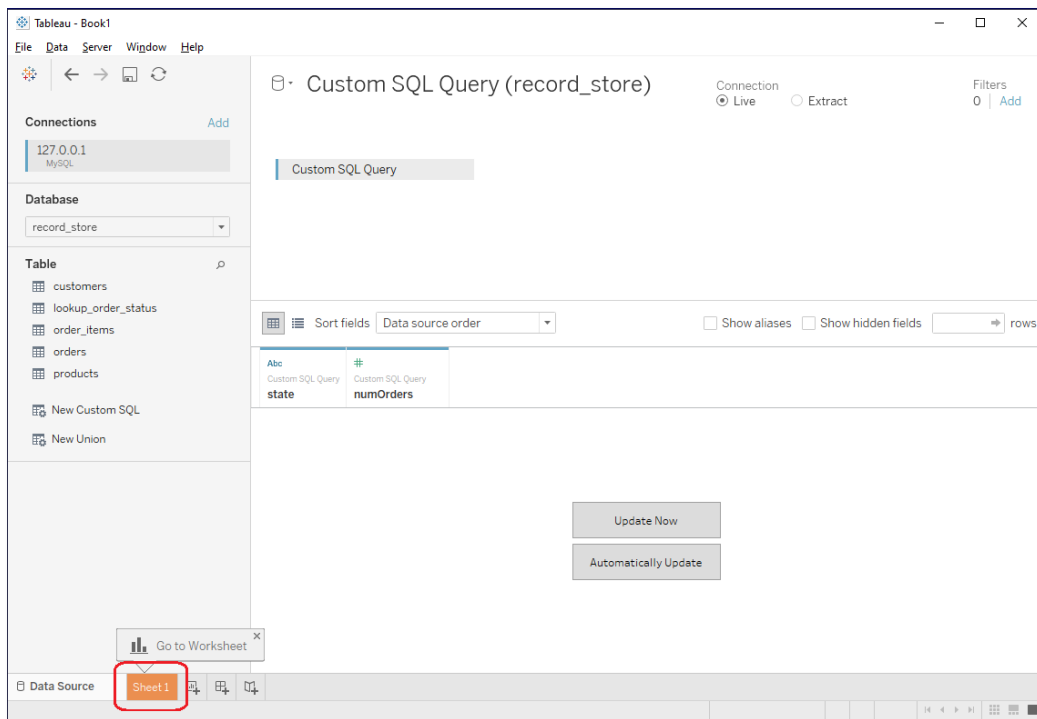


- The **Custom SQL Editor** opens. Either copy and paste our summary query from above into the editor, or type the query in as shown . . .

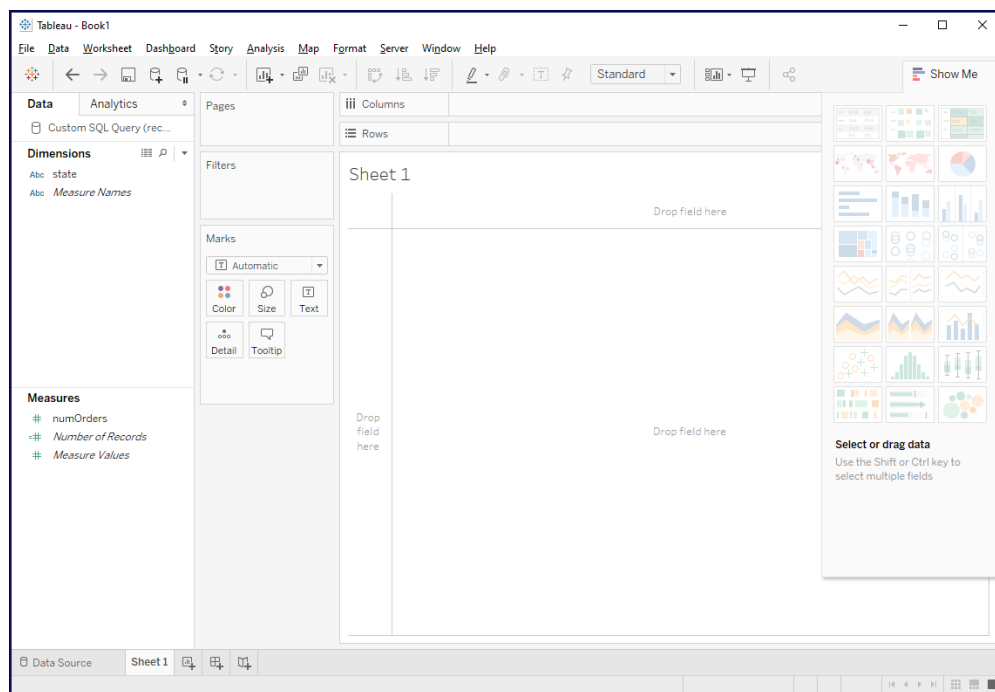


- Once the query is in the editor, click the **Ok** button.
- **Before you continue, make a screen capture of this SQL Edit dialog in your Tableau to submit for your assignment in Canvas.**

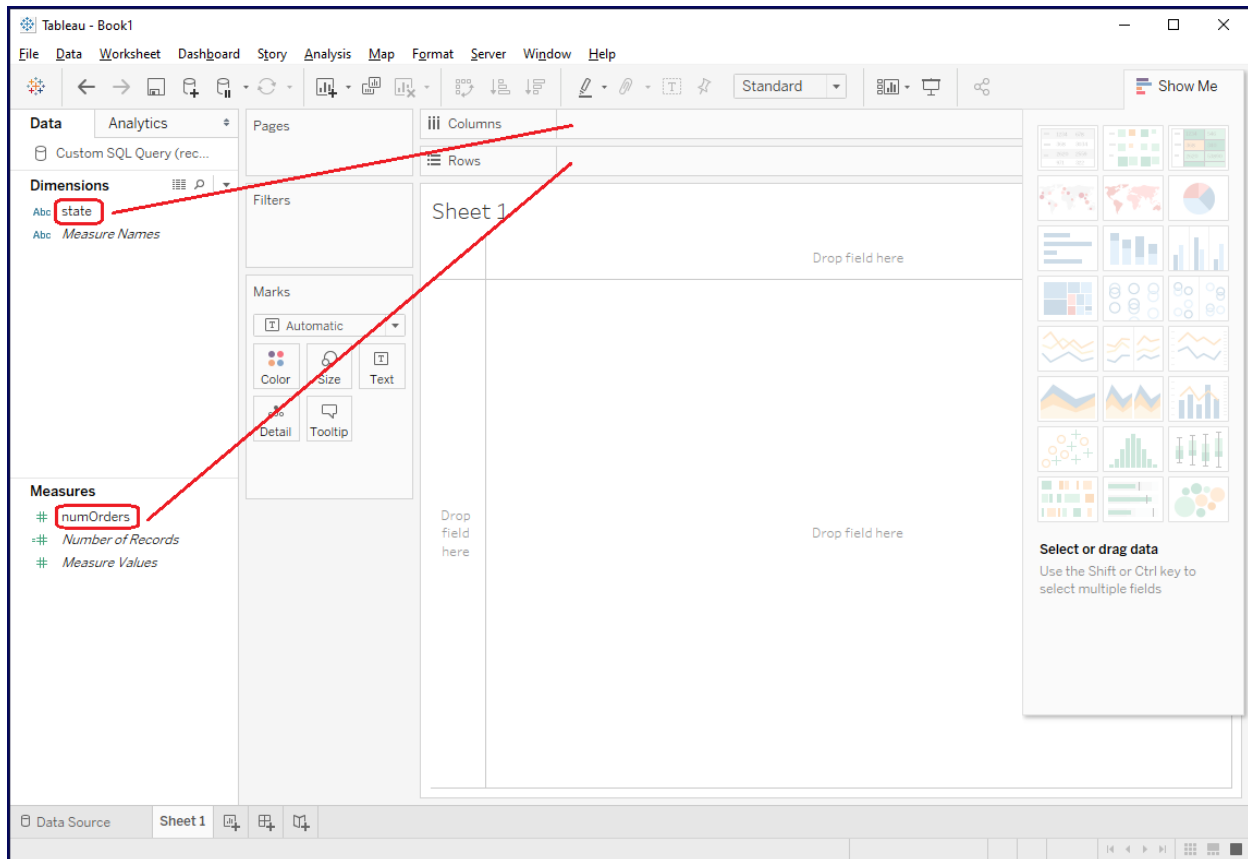
- Next click the **Sheet** button at the bottom of the screen.



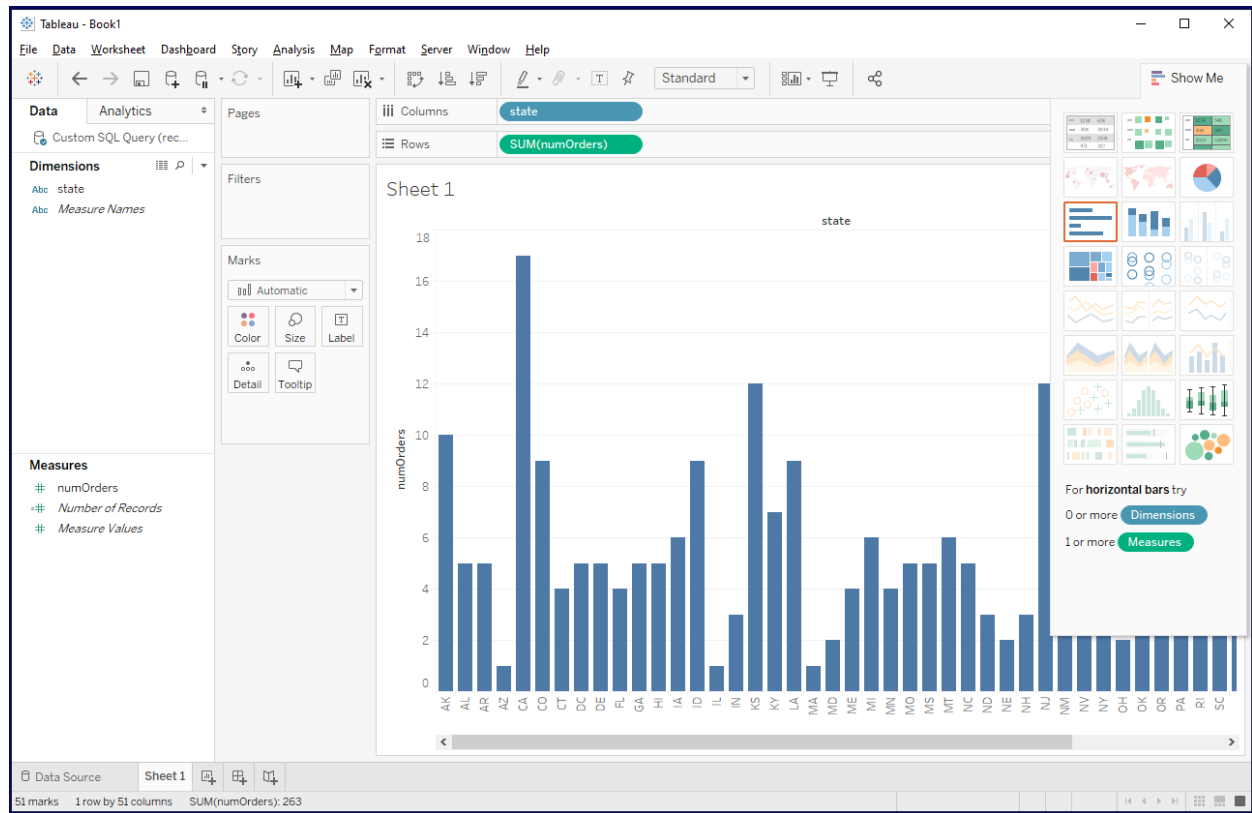
- The sheet editor opens.



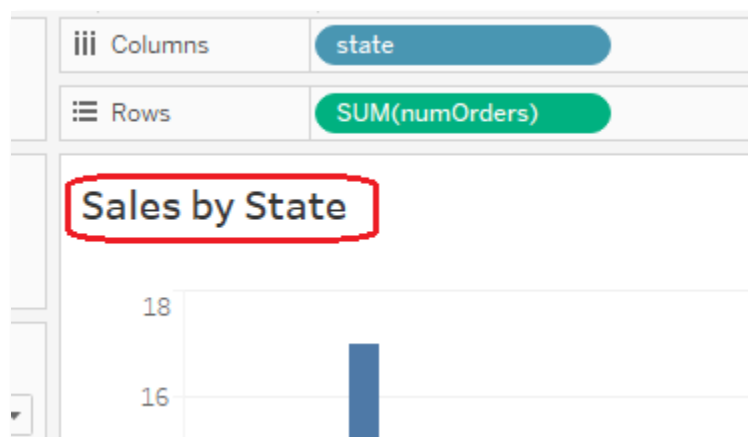
- Next, click and drag the **state Dimension** to the **Columns** list (as shown below) and then click and drag the **numOrders Measure** to the **Rows** list (as shown below).



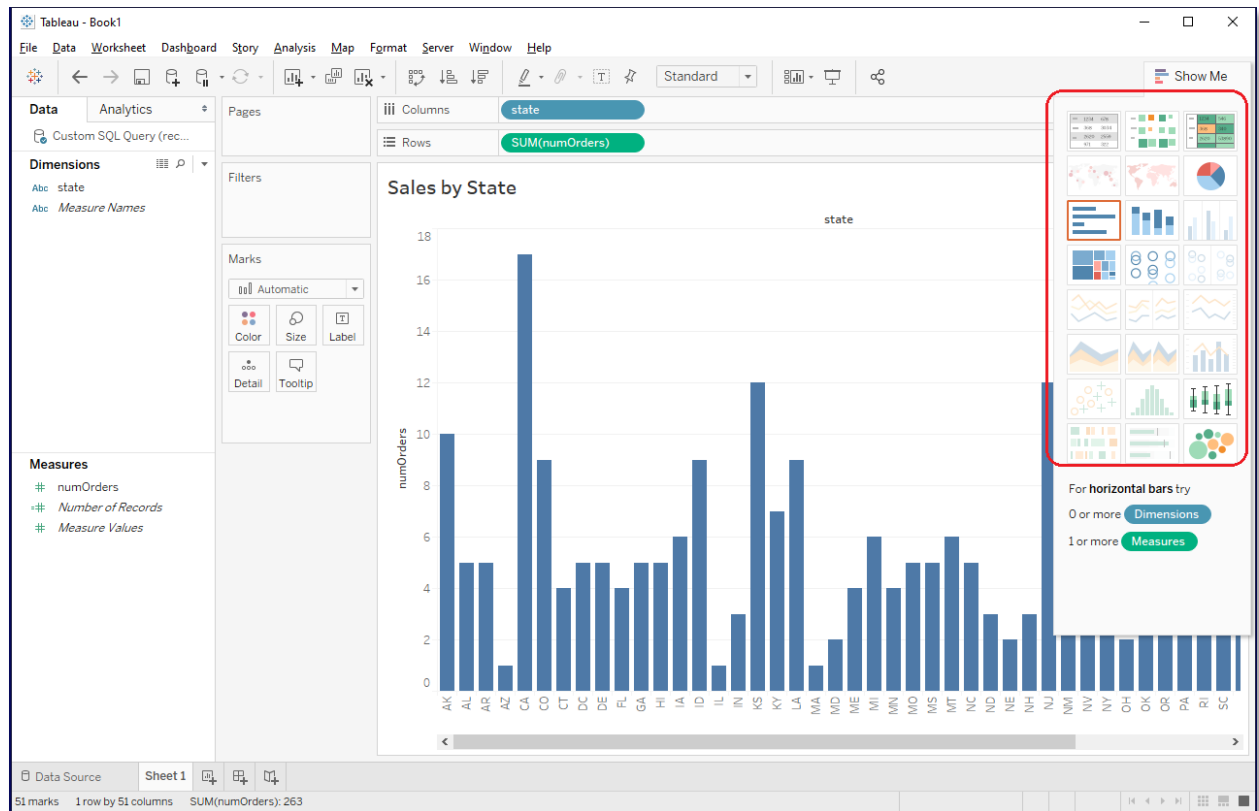
- When you drag Dimensions and Measures as shown above, the **Sheet view** changes to display an initial visualization.
- In this example, the initial visualization looks like this  
 . . .



- Next, double-click the Sheet 1 label just above the graph and change it to **Sales by State**. You can tinker around with the look of the label in the dialog if you wish.
- When complete it should look like this . . .



- Next, you can experiment with the visualization options on the right side to customize your visualization . . .



- Once you are satisfied with your visualization, make a screen capture of the visualization screen to submit as your second screen capture for your assignment in Canvas.