Use Case: Writing SQL in Tableau

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

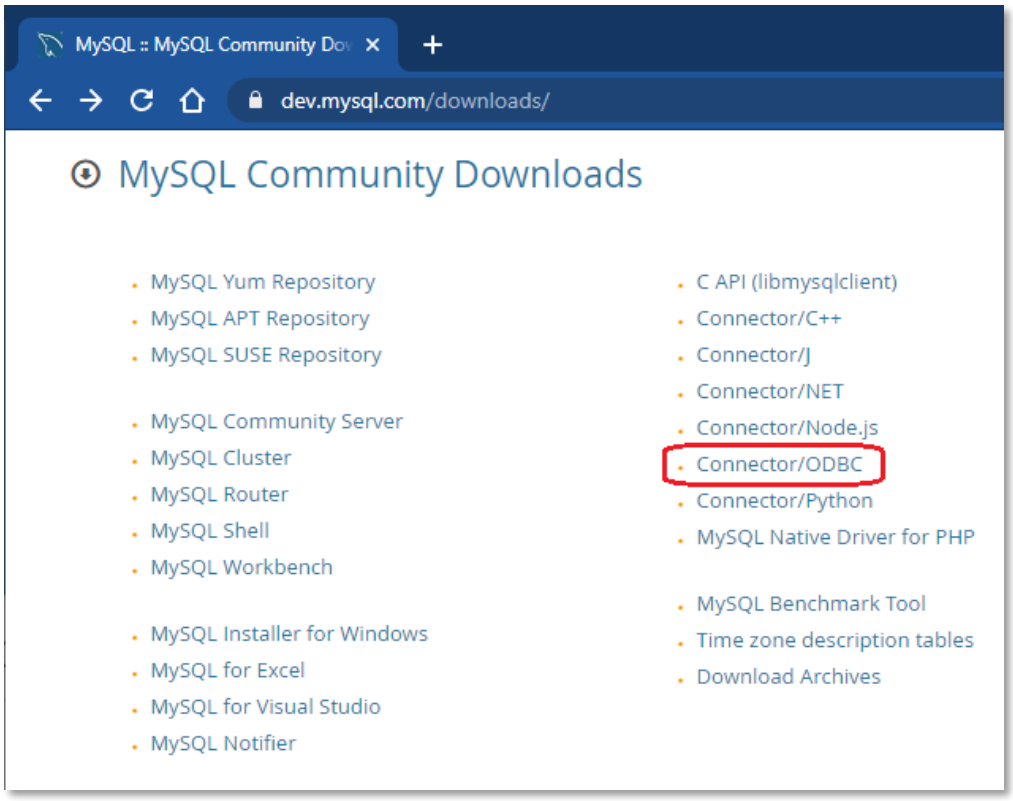
Tableau is an interactive data visualization software that transforms data into actionable insights. In common terms, Tableau takes in data and converts that data into visual representations of the data to help people make observations and draw conclusions based on those visualizations.

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).

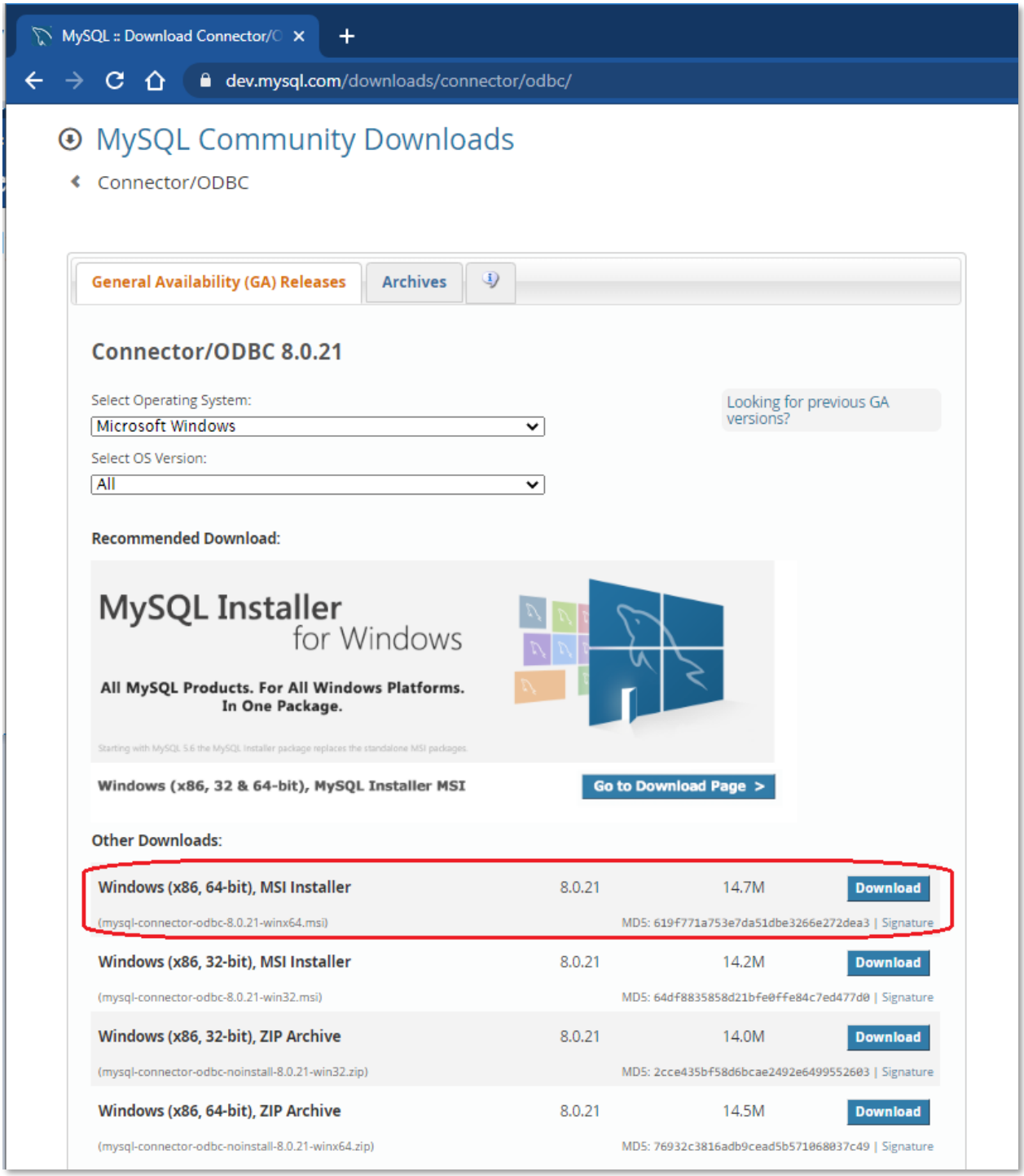
Scenario: In this walk-through we will learn how to connect to MySQL from Tableau so that we can write a query inside of Tableau to extract data from the database for display and manipulation inside of Tableau.

- 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.

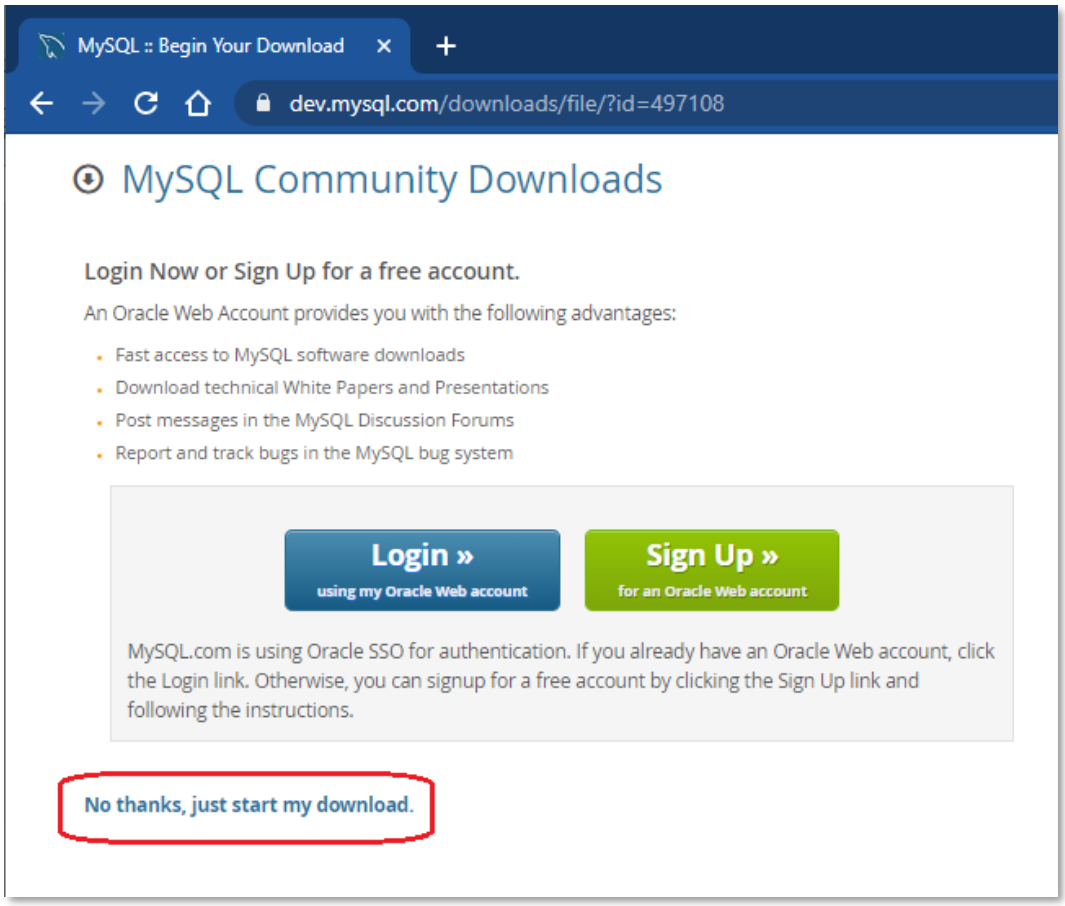
- Next, we need to add a tool called a connector from Oracle for our MySQL database.
- Go to https://dev.mysql.com/downloads/
- And click the Connector/ODBC link …



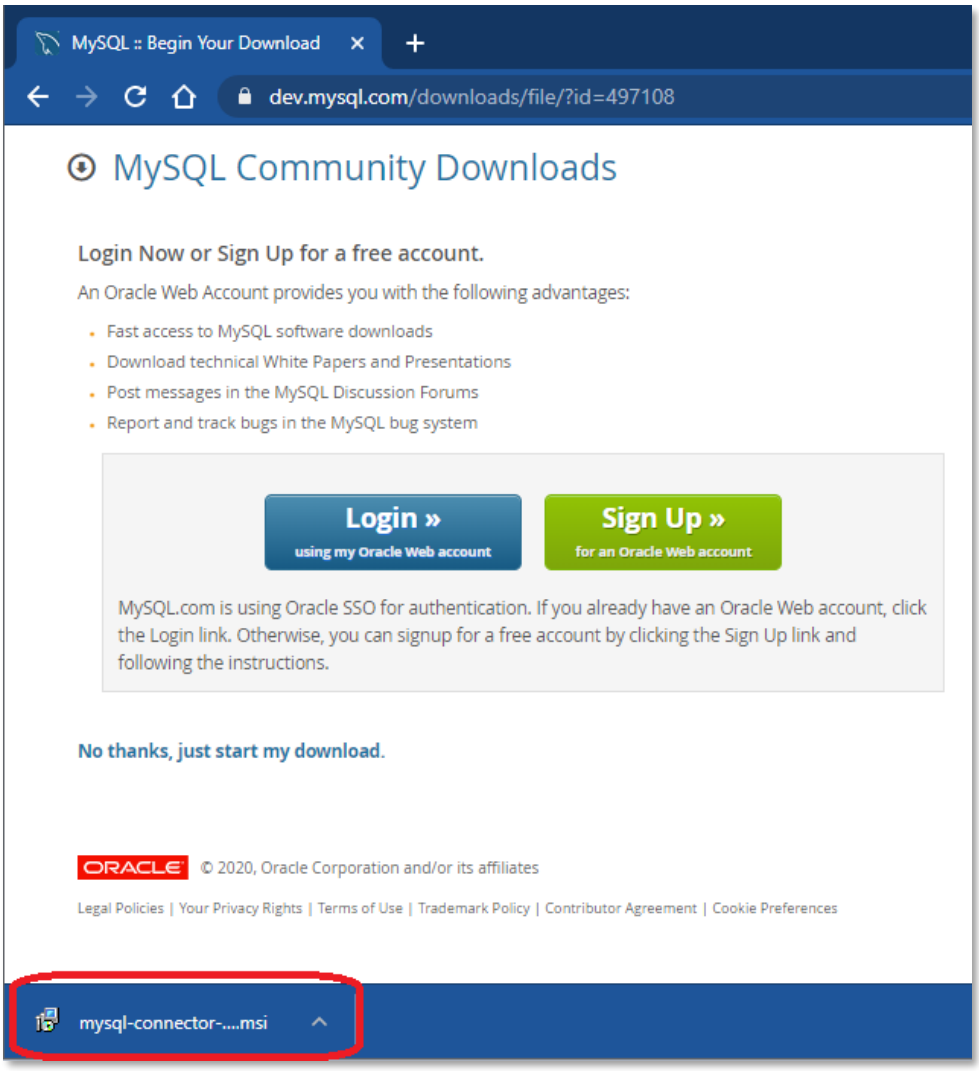
- On the next page select the appropriate item in the Other Downloads list and click the associated Download button.
- If you have a Windows computer set the Operating System dropdown to Windows, or MacOS if you have a Mac, or select the version of Linux you have if you have a Linux computer.
- For the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



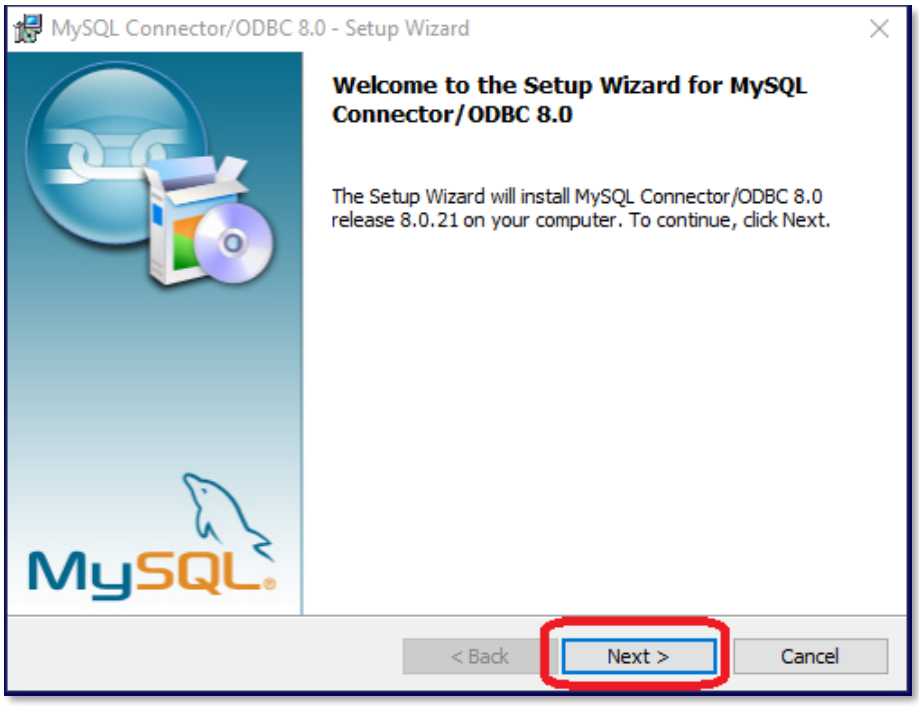
- Click the Download button



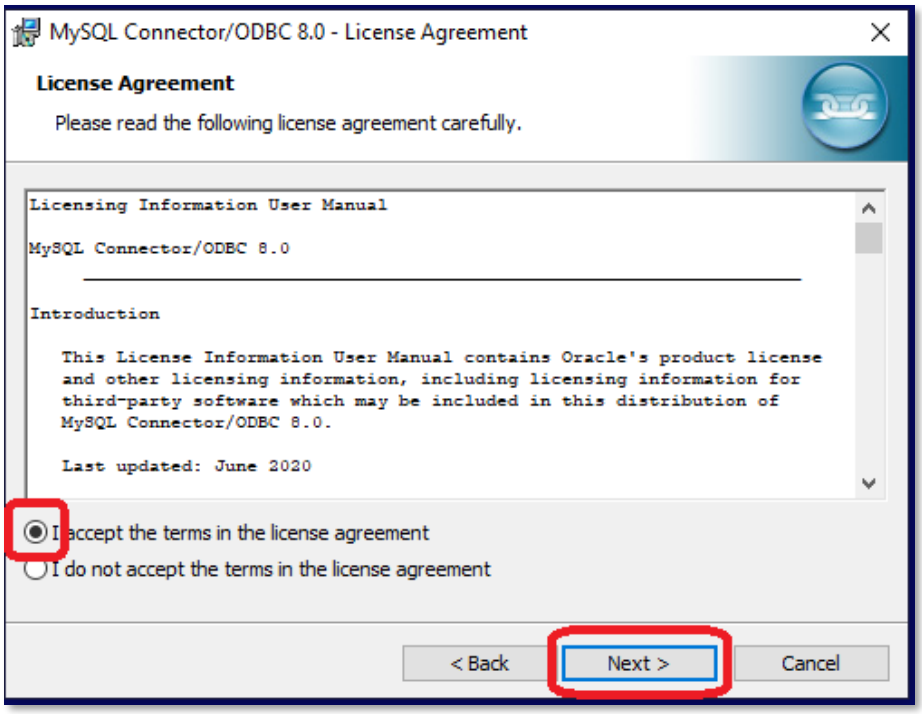
- Click the No thanks, just start my download link.
- The software will download and you should see it at the bottom left of your browser.



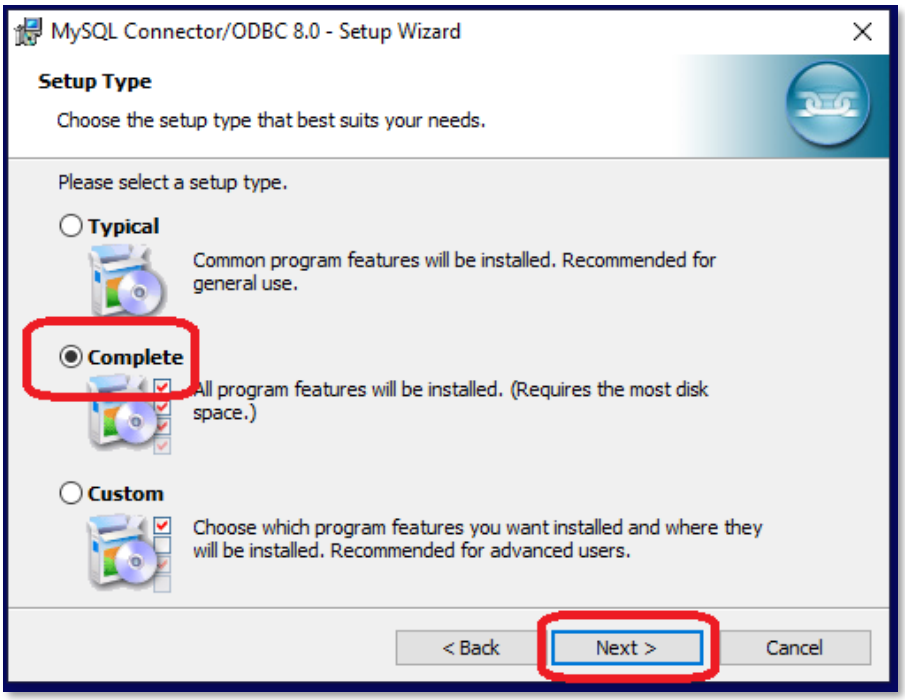
- Double-click the downloaded msi file to begin the installation.



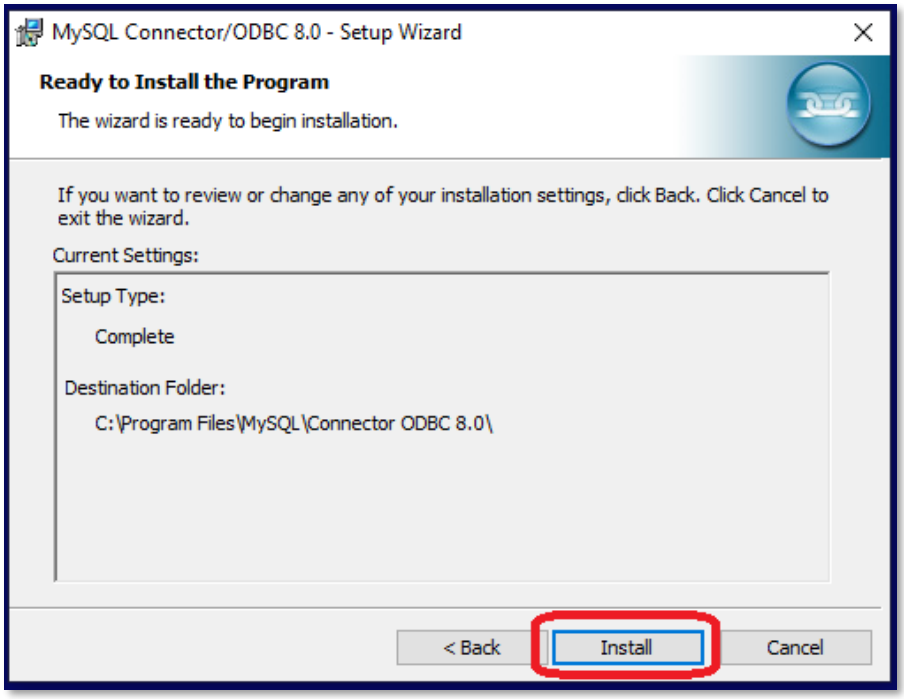
- Click the Next button.



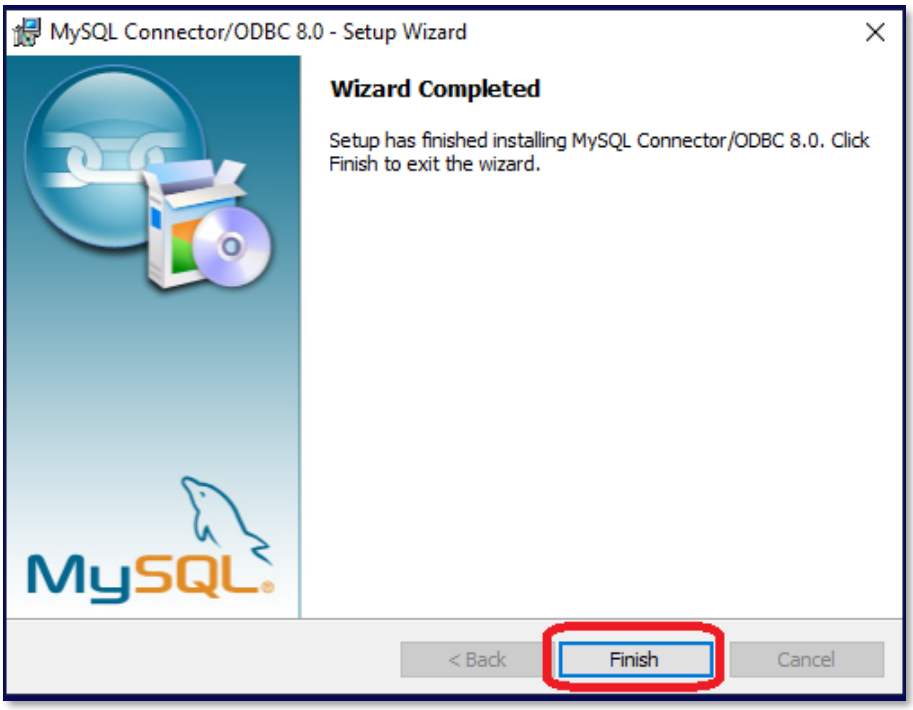
- Select the Accept button and then click the Next button.



- Click the Complete button and then Next.

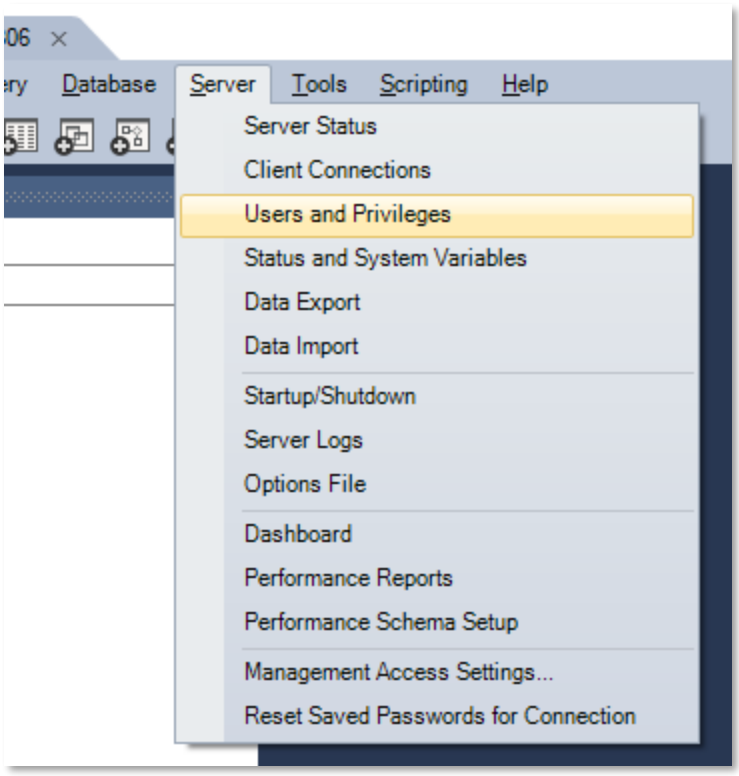


- Click the Install button.

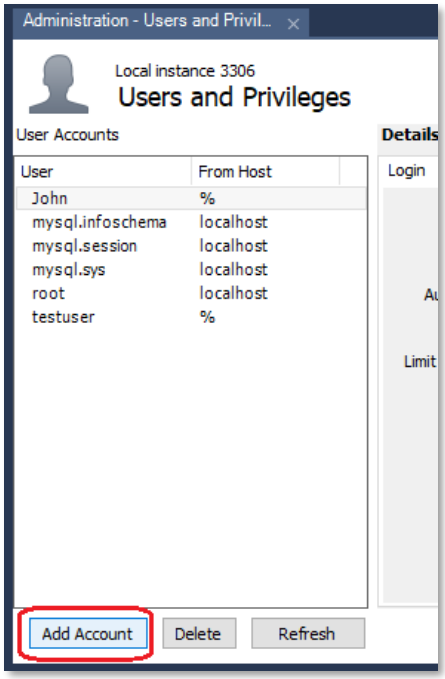


- When the installation completes click the Finish button.

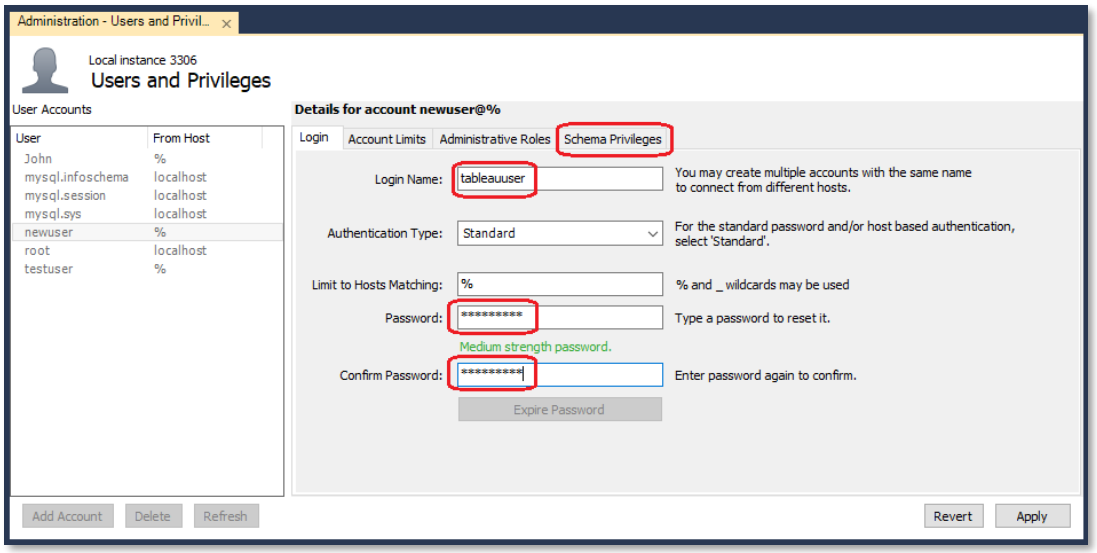
- Next we need to create a user account in MySQL that we can use to connect to the database from Tableau.
- Open MySQL Workbench and open your local instance connection.
- Database software, such as MySQL, includes security to restrict access to the data. When an external application needs to connect 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.



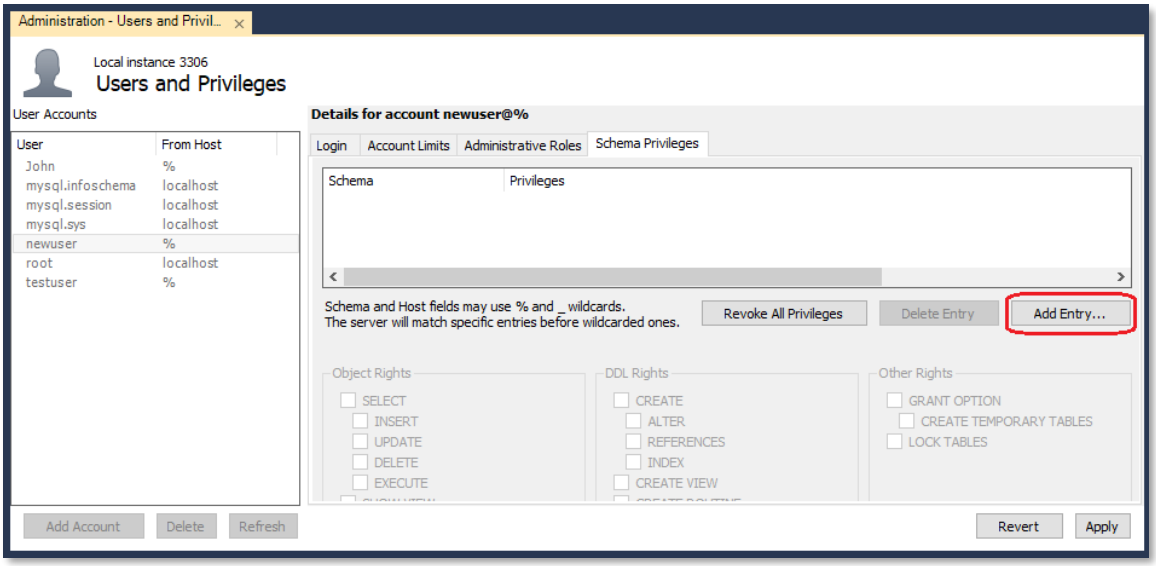
- The Users and Privileges tab will open.
- Click the Add Account button.



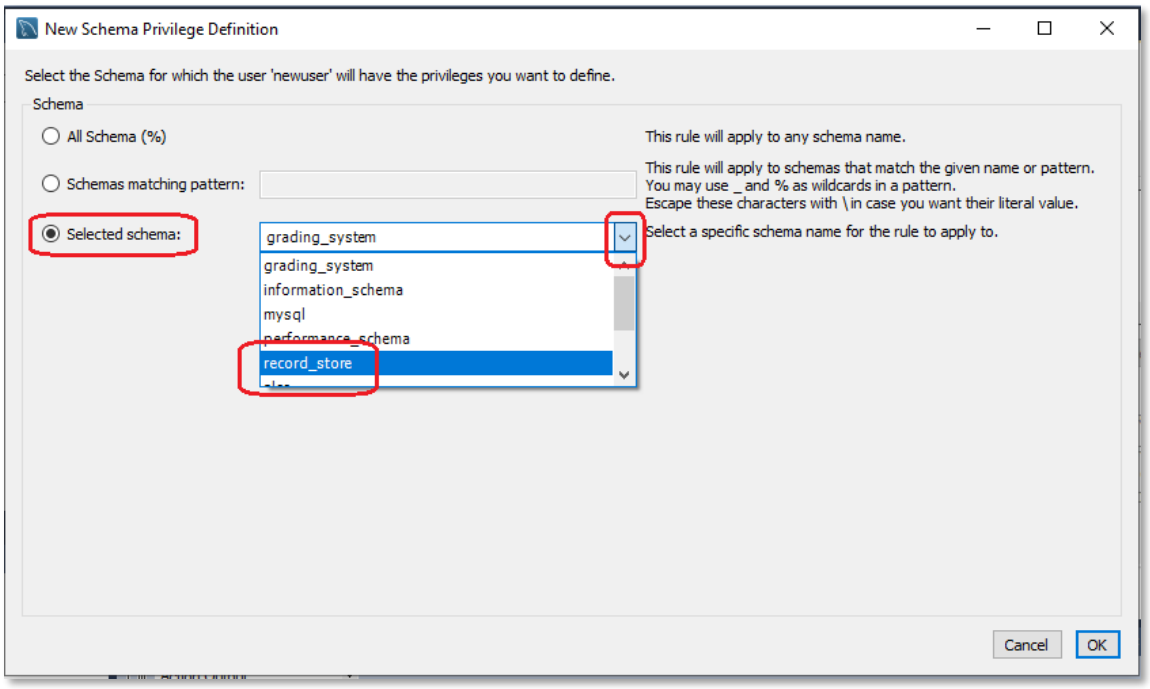
- As shown on the screen capture below, in the Details for account newuser@% area change newuser to a different user name, for this example I used tableauuser. And then enter a Password and Confirm Password (the two must match).



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

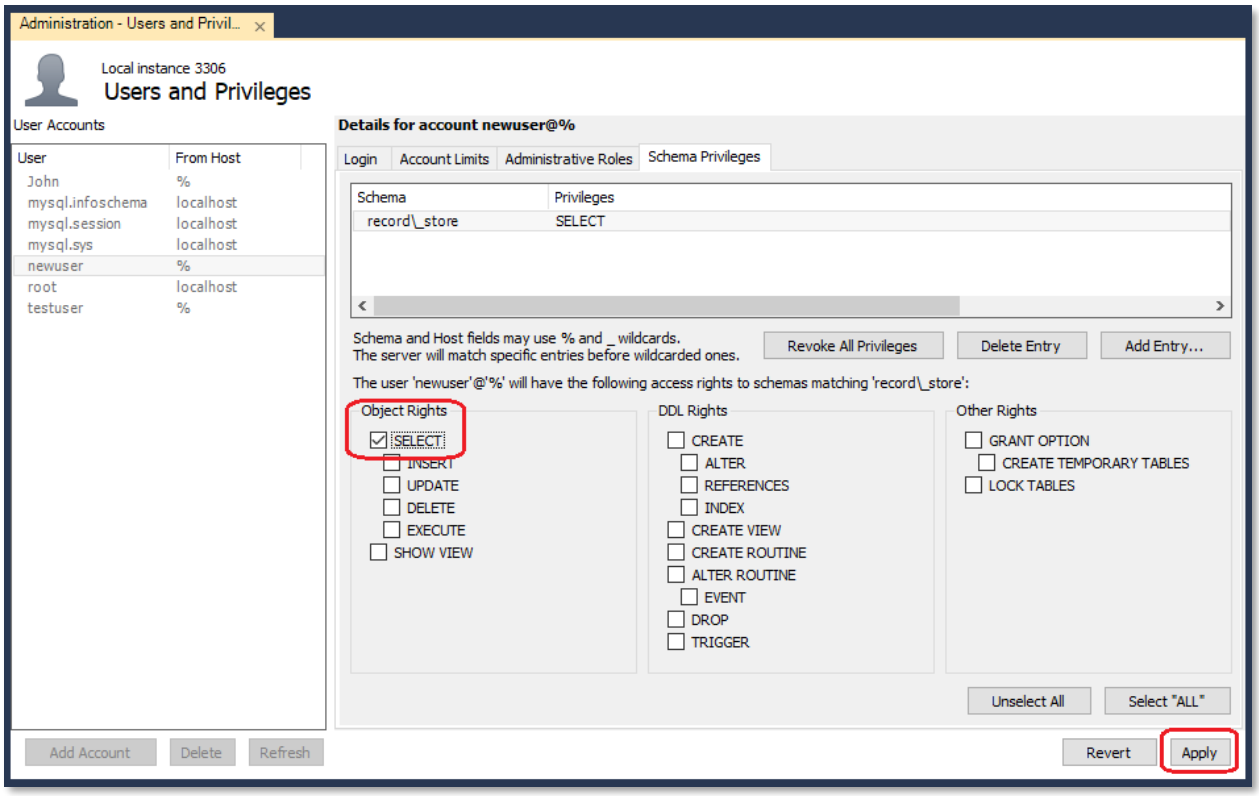


- On the next dialog select the Selected Schema button, then click the down arrow to drop down the list of schemas, select the record_store schema and then click Ok.

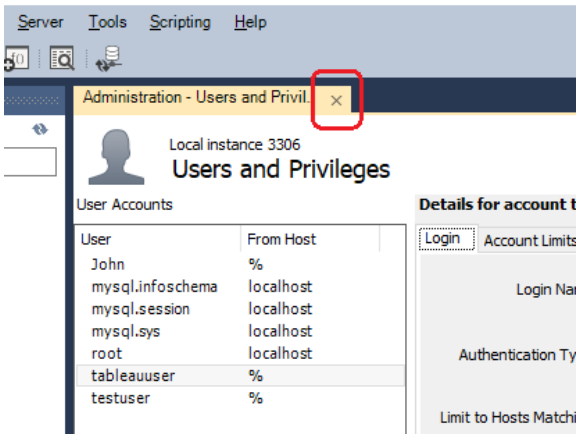


- The next dialog is where we set the specific privileges for access to the database for this new user.
- For this use case, in production systems, of accessing the database from Tableau for the purposes of running a SELECT statement to visualize the data, we would restrict access to SELECT only. This 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.).



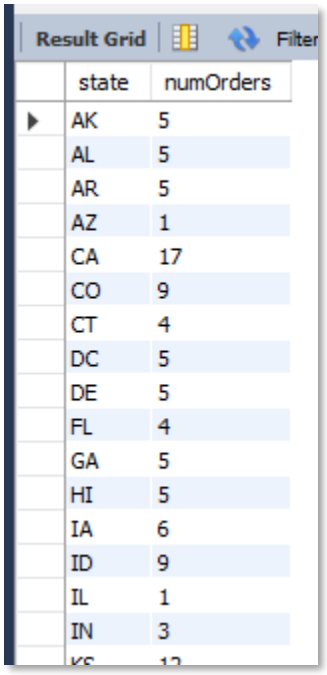
- We will use this new user login from inside of Tableau to connect to our database.
- You can close the Administration – Users and Privileges tab now.



- 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;
```

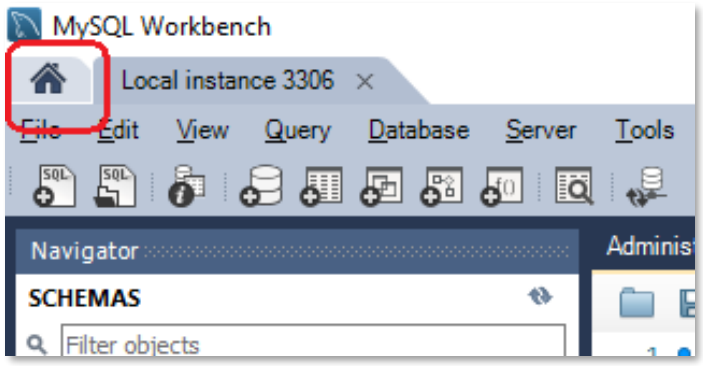
- Run the query in Workbench.
- What does this query show us? Review the query results in Workbench (see the screen capture below).



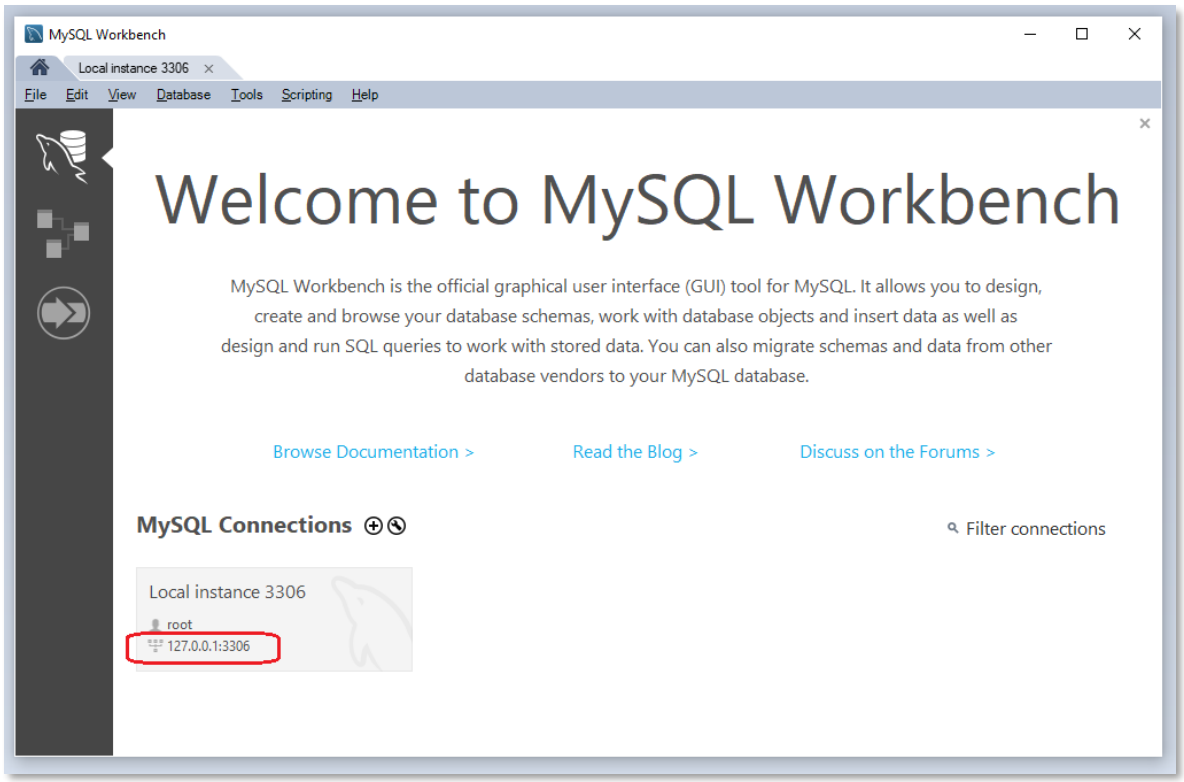
state	numOrders
AK	5
AL	5
AR	5
AZ	1
CA	17
CO	9
CT	4
DC	5
DE	5
FL	4
GA	5
HI	5
IA	6
ID	9
IL	1
IN	3
KS	12

- 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.

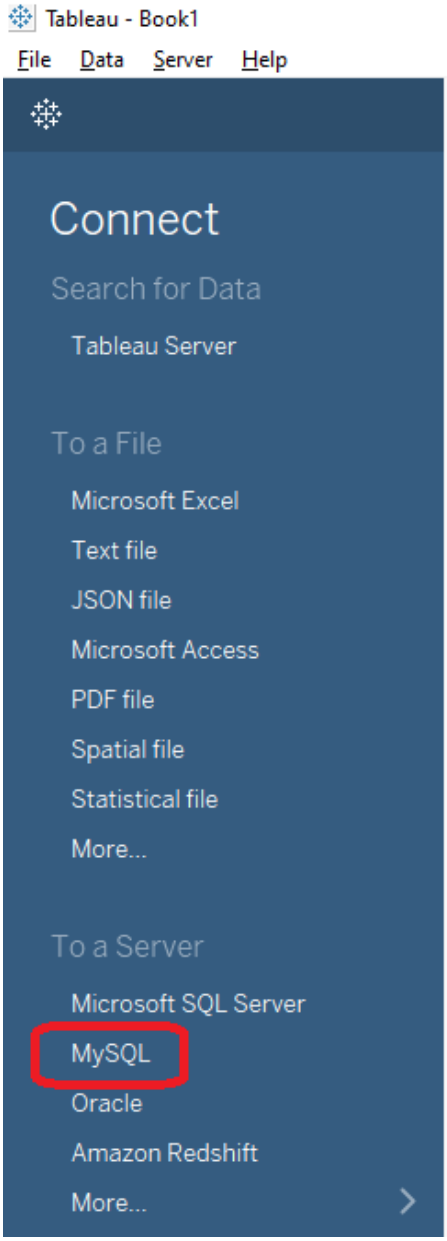
- Get your MySQL server details
  - We will need your MySQL server information. To get this information go back to MySQL Workbench and click the Home tab located at the top-left of Workbench:



  - 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):

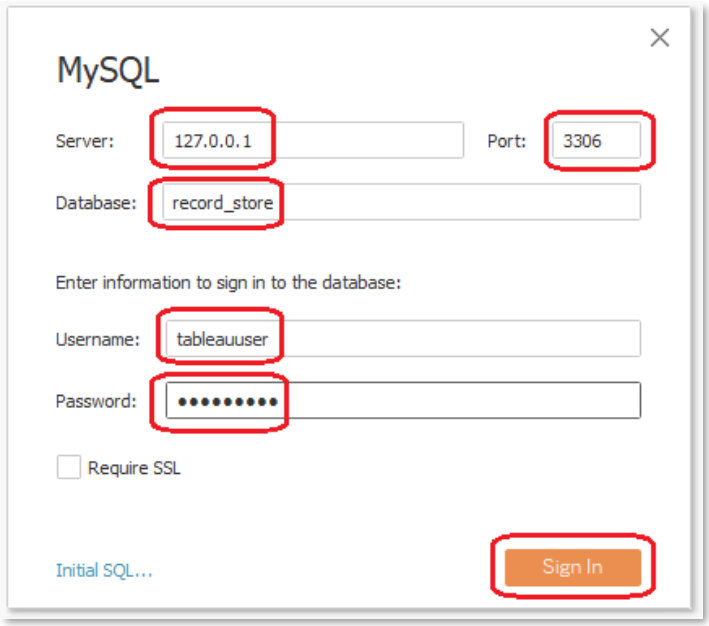


- Next, we're going to connect to MySQL from inside of Tableau...

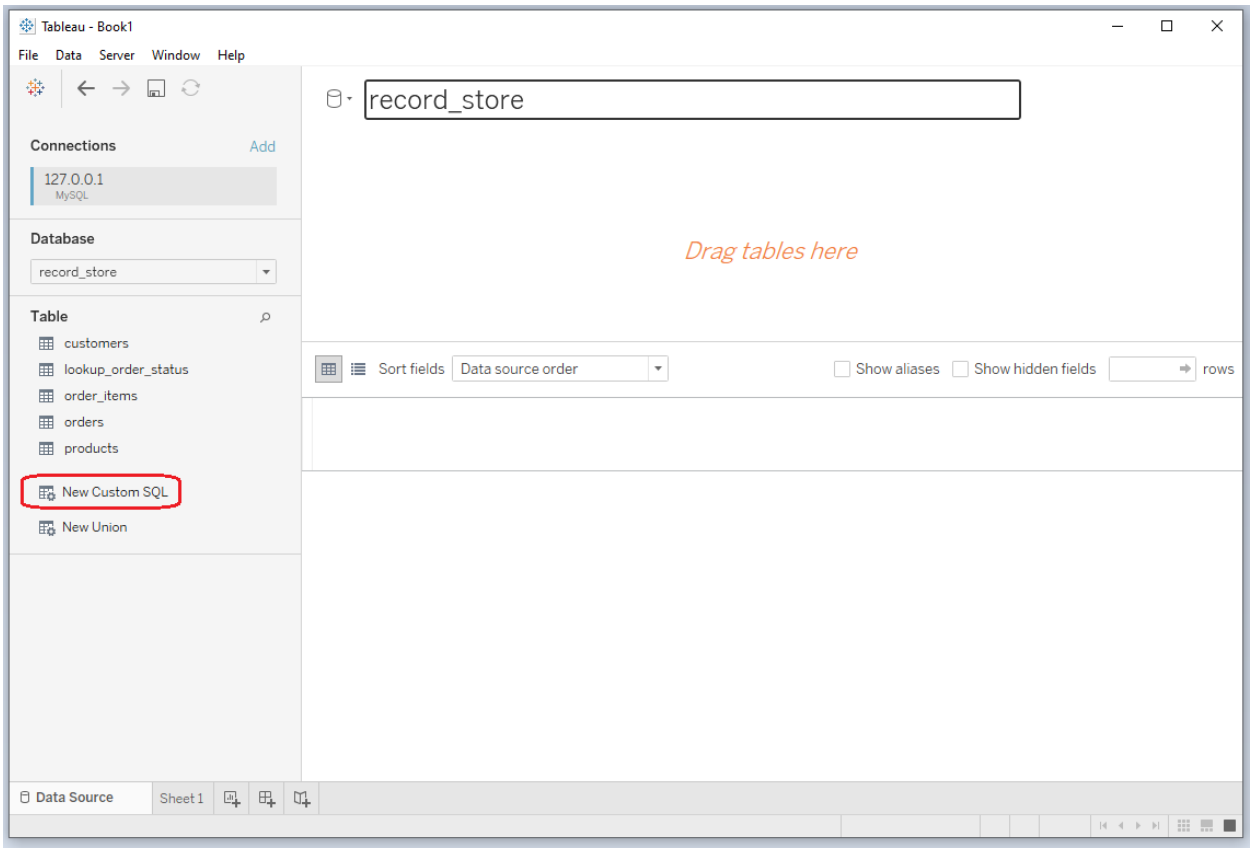


- Open Tableau Desktop.
- You will see the Tableau Connect menu on the left side of the screen.
- Click the MySQL option under the To a Server section.

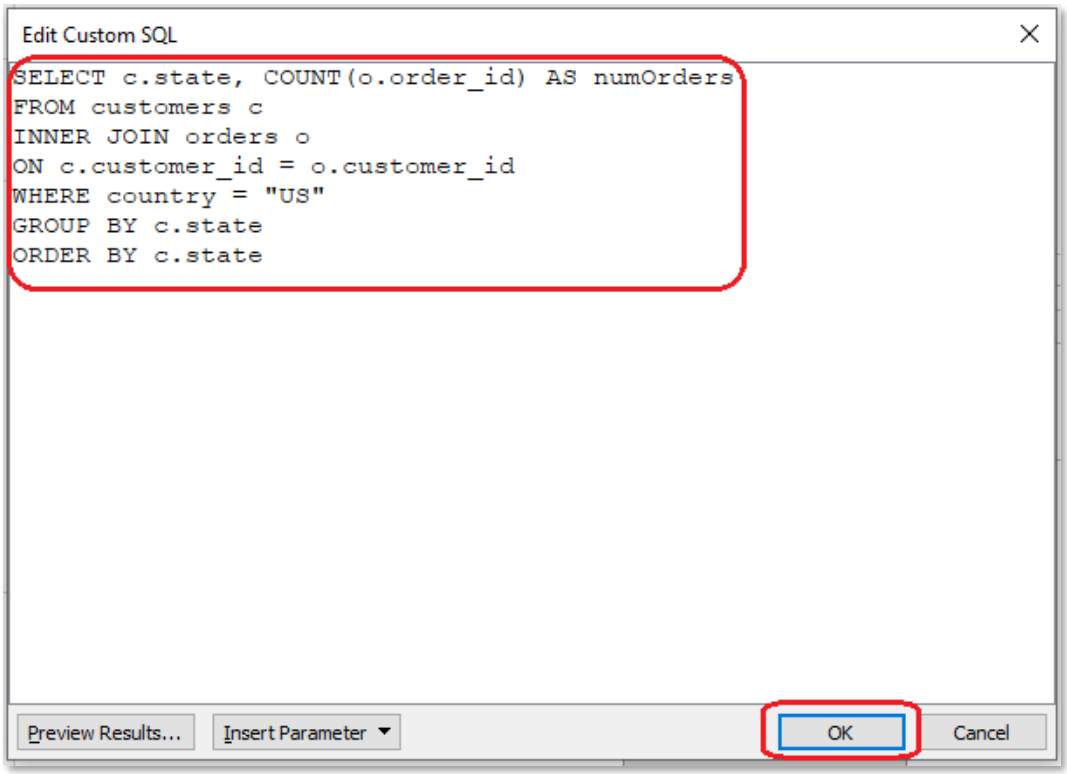
- You will then see the Connection dialog . . .



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



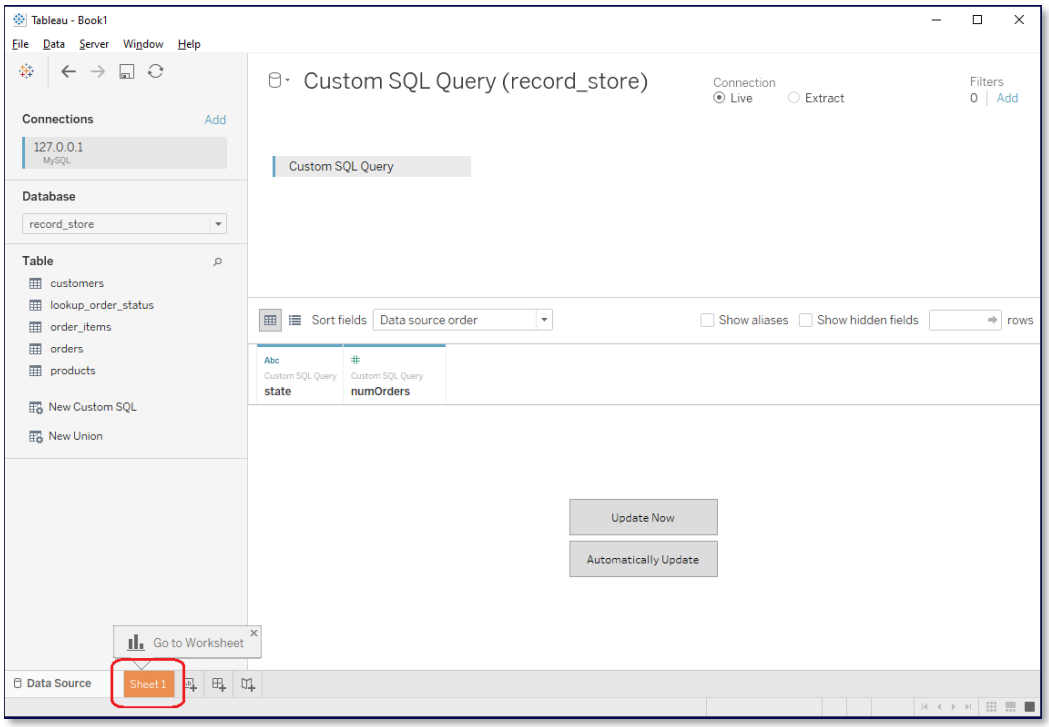
- The Custom SQL Editor opens. Either copy and paste our summary query from above into the editor, or type the query in as shown . . .



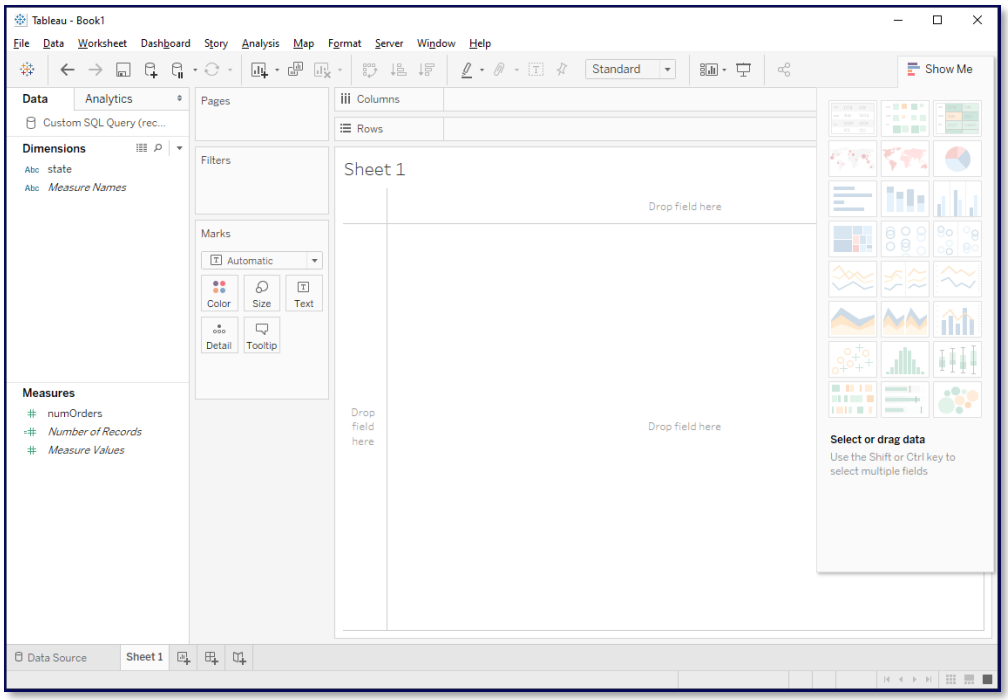
- Once the query is in the editor, click the Ok button.

- **Before you continue, make a screen capture of this SQL Edit dialog in your Tableau to submit for your assignment in Canvas.**

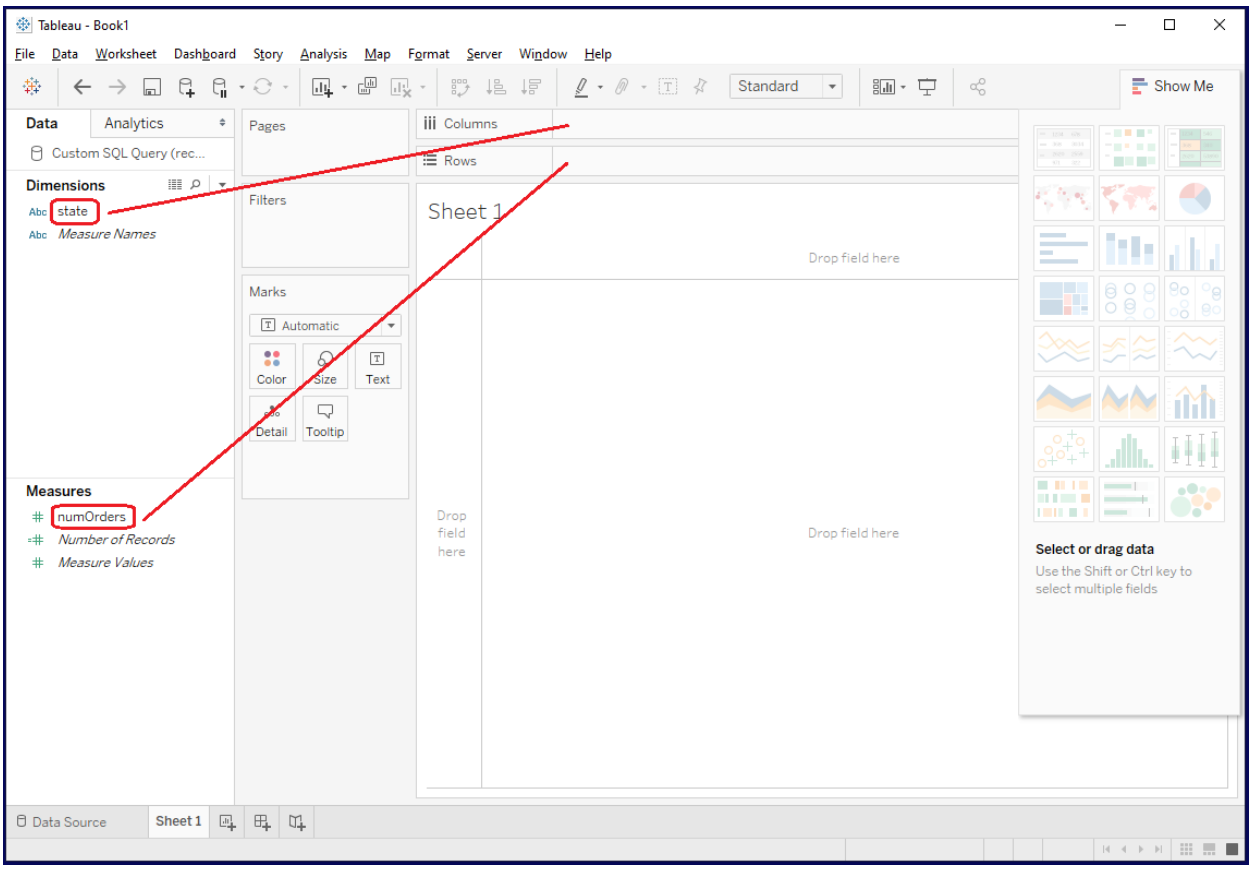
- Next click the Sheet button at the bottom of the screen.



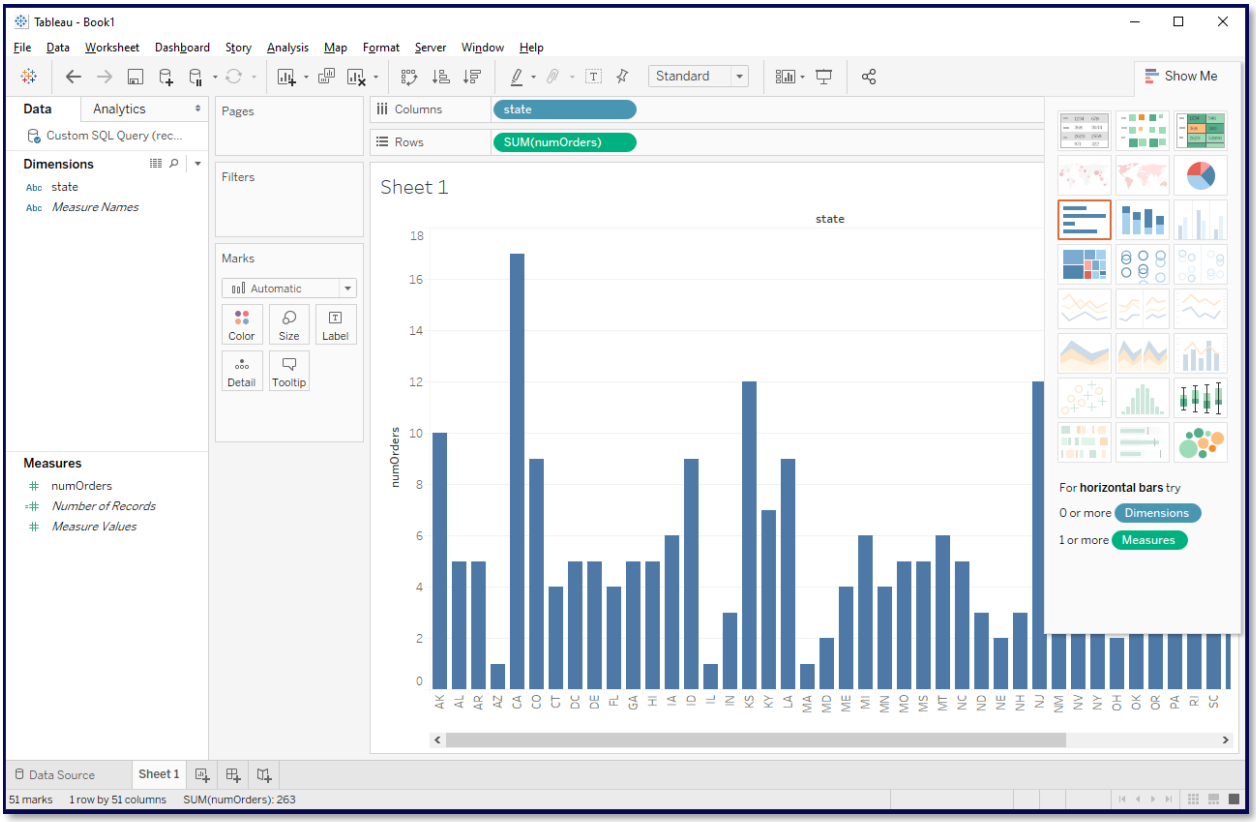
- The sheet editor opens.



- 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).

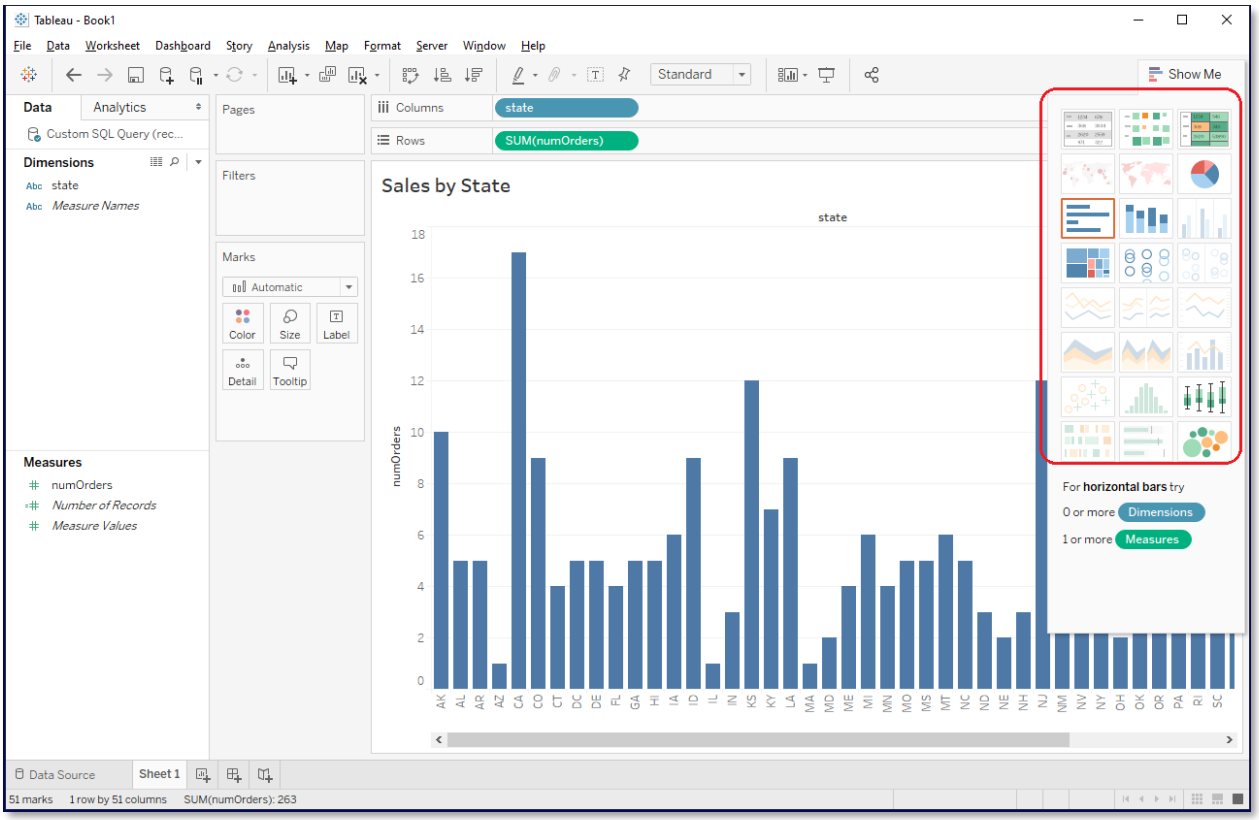


- When you drag Dimensions and Measures as shown above, the Sheet view changes to display an initial visualization.
- In this example, the initial visualization looks like this . . .



- 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.**