

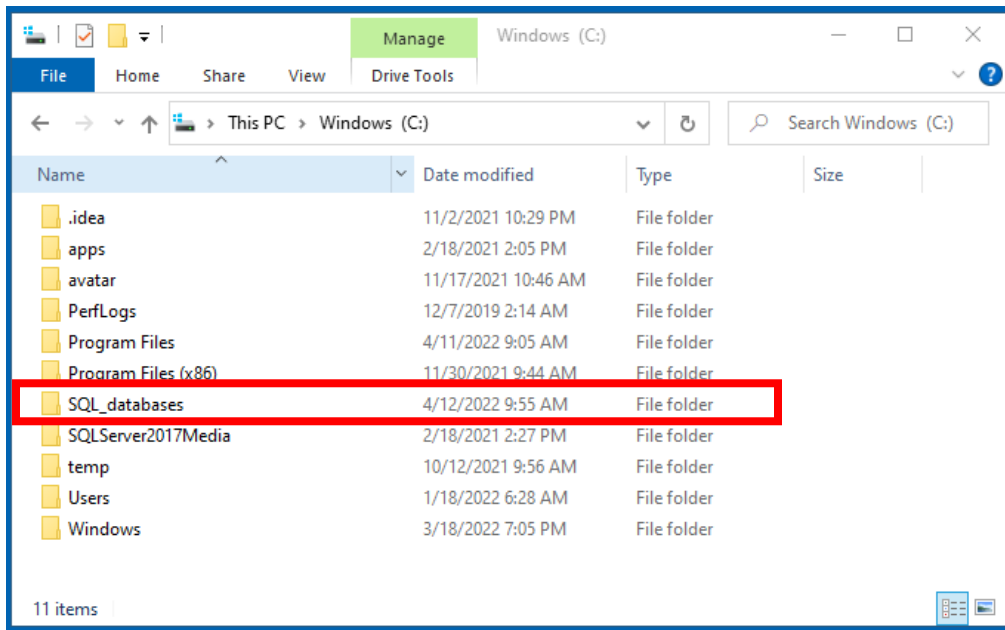
Loading and Viewing a County SQL Database Version 4 – 8/4/2022

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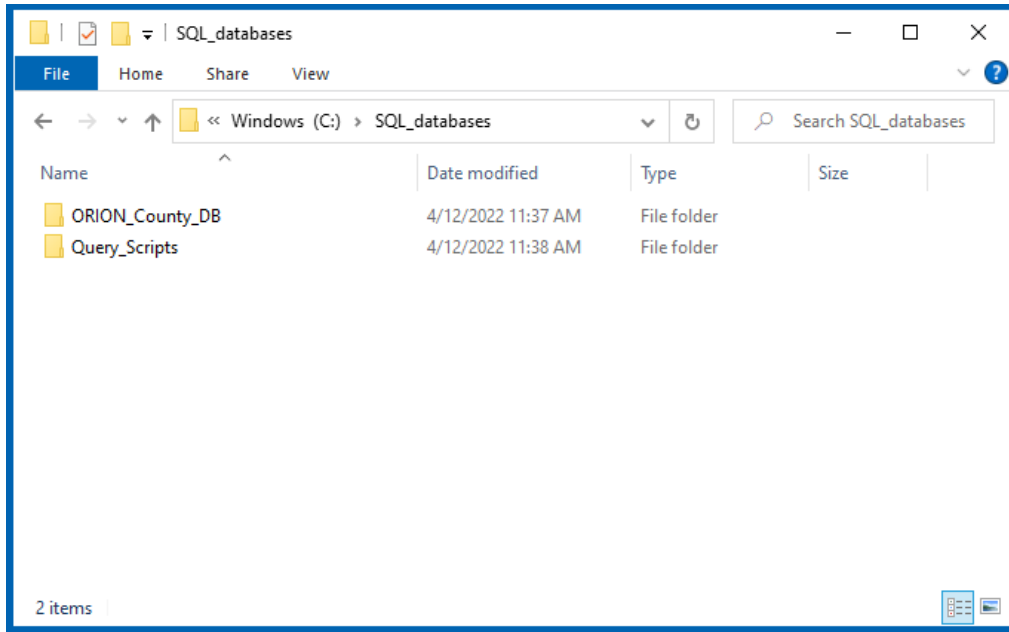
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Downloading Data Files

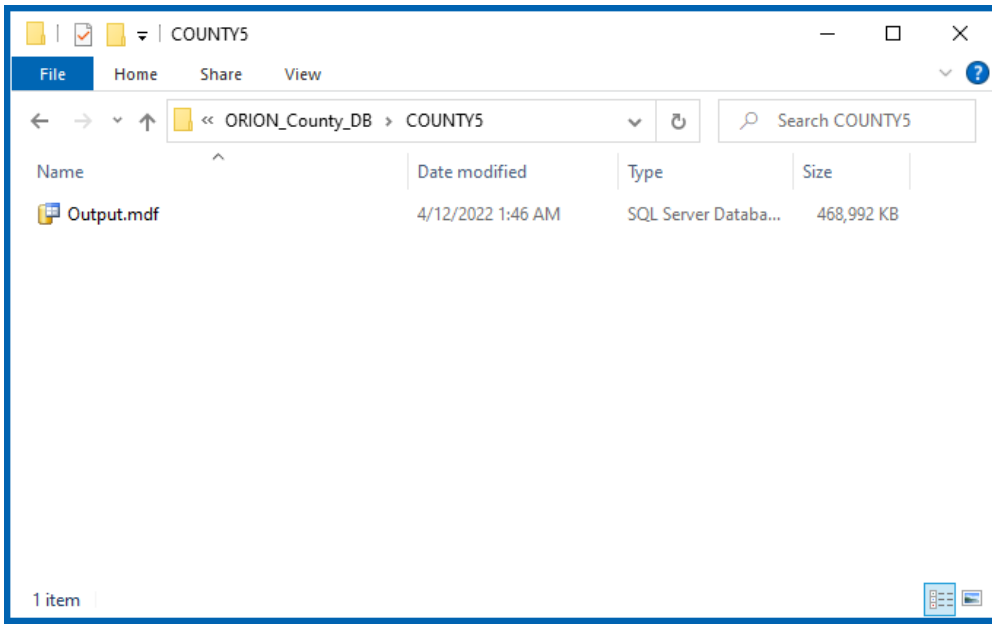
1. The installation process of Microsoft SQL Express does not include network connectivity, you must store SQL databases and queries in a local file system. We recommend a file structure similar to the following screenshot.



2. Create a folder called **SQL_databases**. Within that folder create two folders called **ORION_County_DB** and **Query_Scripts** (you will need this folder later).

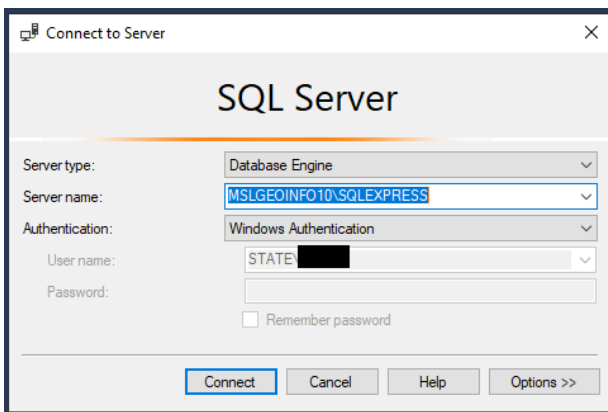


3. Within a browser, go to [Montana State Library FTP](#), within the SQL database directory, download the **BEGIN HERE.ZIP** and unzip it into a folder called **Documentation**. There is a **Revised Data Dictionary.xlsx** & **Orion Data File Diagram.pdf** within that folder that will be handy to reference from time to time in the future.
4. The county directories are listed by the county number (often referred to as the county license plate number), see a complete list of the counties [here](#). Click on the **COUNTY [county number].ZIP** to download the SQL database for that county. Move or save that zip file to your **ORION_County_DB** folder.
 - a. There is a Statewide directory (**STATE_WIDE.ZIP**) but it will run incredibly slow using Microsoft SQL Express. The speed will depend on how many records you need to pull. An example of when you'd want to use the Statewide SQL database is to pull a table from 2-5 counties (i.e. residential buildings for Madison, Gallatin & Park counties).
5. You'll need to extract the zip file you previous saved into your **ORION_County_DB** folder. You can either extract the zip file with the default Windows tools that will create a folder to extract the content to or use 7zip to use the method **Extract Here** to copy the file to the base folder of **ORION_County_DB**. Either method will work fine. The below screenshot shows the folder after the zip file was extracted (COUNTY5 is Lewis & Clark County). Feel free to rename this folder to the county name or to something more recognizable.



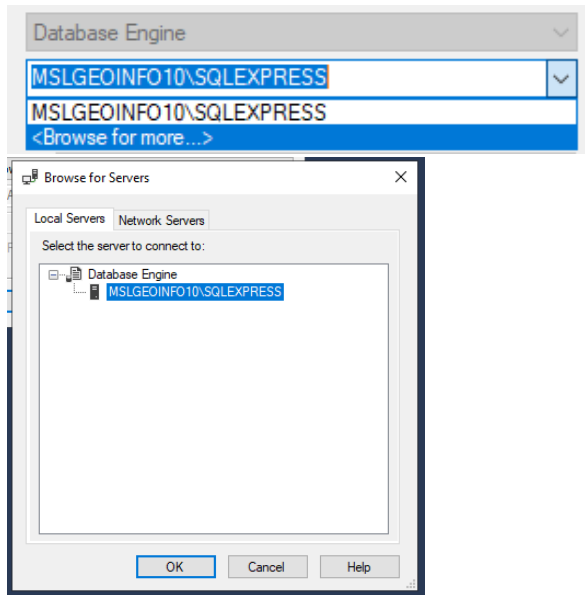
Loading SQL Data Files in SQL Server Express

1. Open Microsoft SQL Server Management Studio (SSMS)
 - a. Go to **Start>Microsoft SQL Server Tools 18>SQL Server Management Studio**
 - i. Or you may have a desktop icon
 - b. Run the program as administration by right clicking **More>Run as Administration**
 - i. Or right-click **Run as Administration** if on the desktop



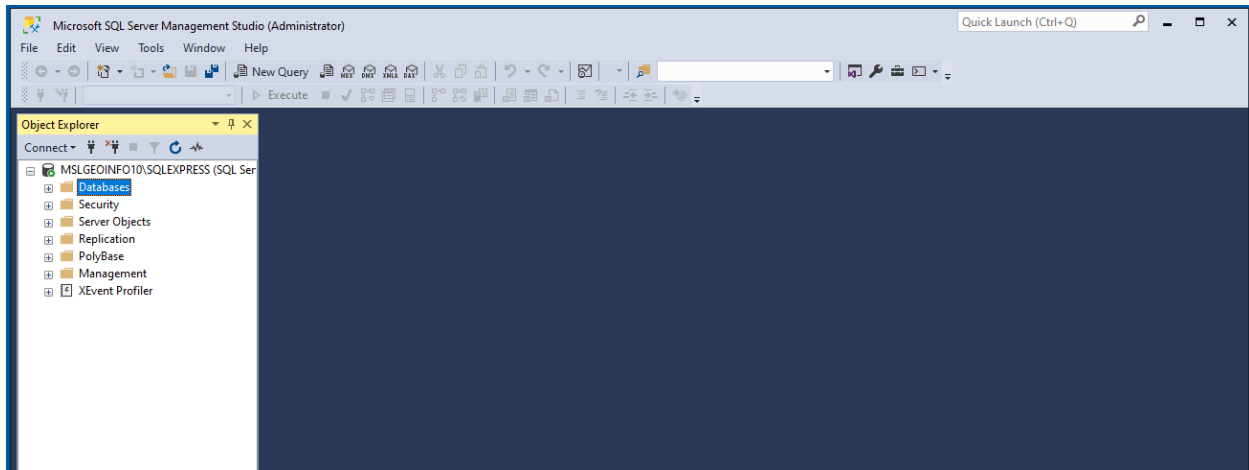
2. You should the screen above. By default, your server name should appear as *Your Computer Name*\SQLEXPRESS. Click **Connect** and you should be connected to the SSMS.
 - a. If you receive an error, it may be related to your server name.
 - b. Try entering in as the Server name either:
 - i. LocalHost\SQLEXPRESS
 - ii. LocalHost

- c. If there's still issues, you can try clicking the dropdown menu for Server name and then click **browser for more..>**. Expand **Database Engine** and you should see your local server name. Click on it and then click Ok.

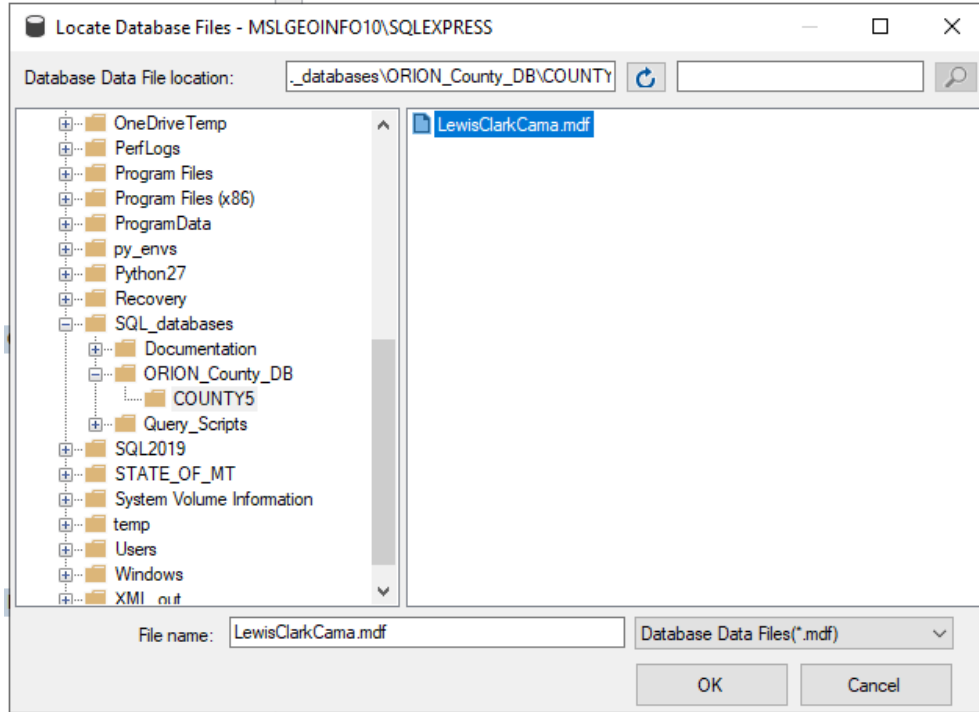


3. Attaching a county SQL database file

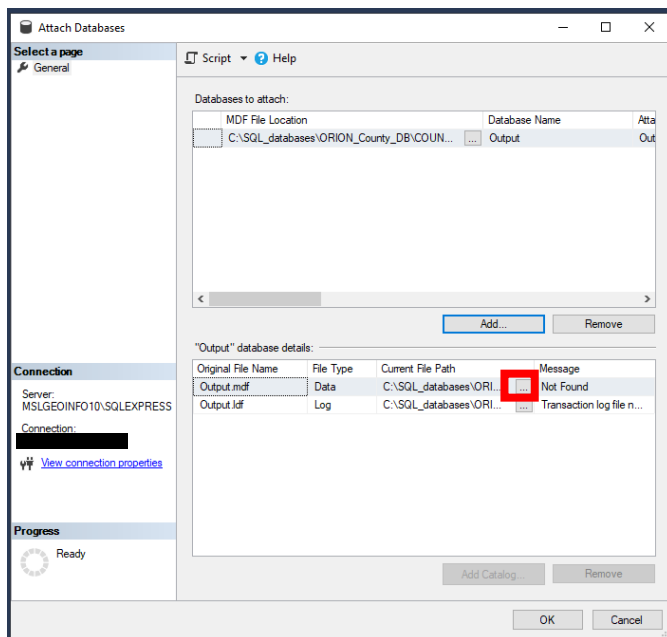
- a. Once connected to SSMS, you will see a similar view as the screenshot below:



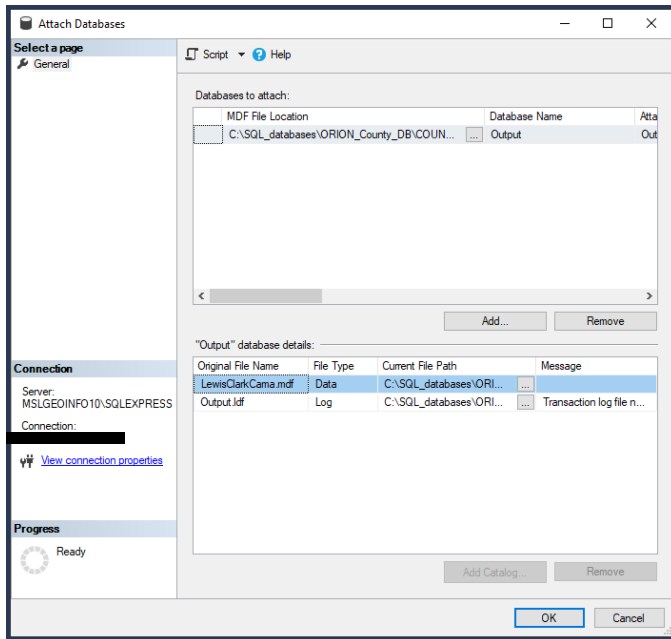
- b. Right click on the **Databases** folder (on the left side of SSMS navigation screen) and click on **Attach**.
- c. Click the **Add** button. Navigate to your SQL_databases/Orion_County_DB folder (or whatever you decided to call it in Downloading Data Files > Step 1.) and expand the county database you downloaded. In the county folder, you will find a file with and **.mdf** extension.



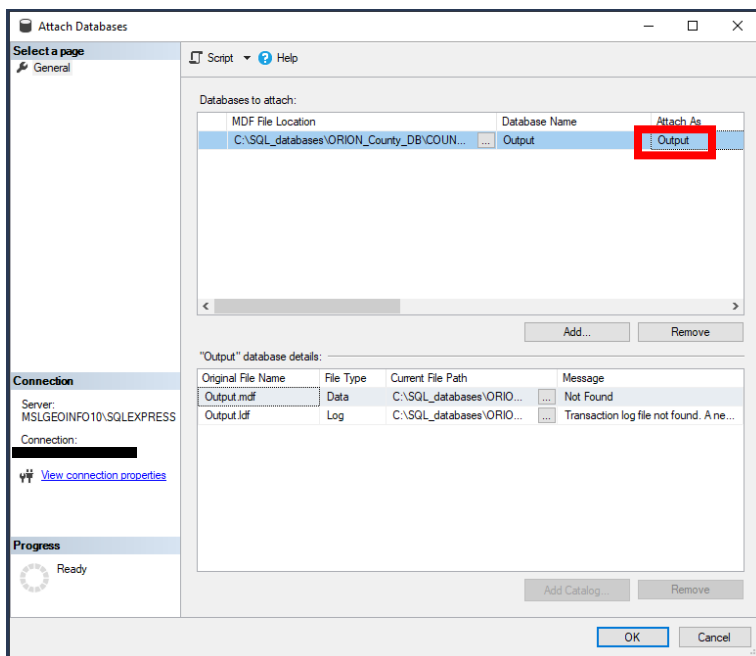
- d. By default, this file will be named County **Output.mdf**. You can rename these files within the Windows/File Explorer window to **LewisClarkCama.mdf**, (as shown in the screenshot above) or to the county you are working with.
- e. In the previous screenshot we **renamed (prior to attaching)** the .mdf file to something more recognizable than just “Output”. Click on desired file you want to attach and then click **OK**.
- f. At this point, you should see the screen below:



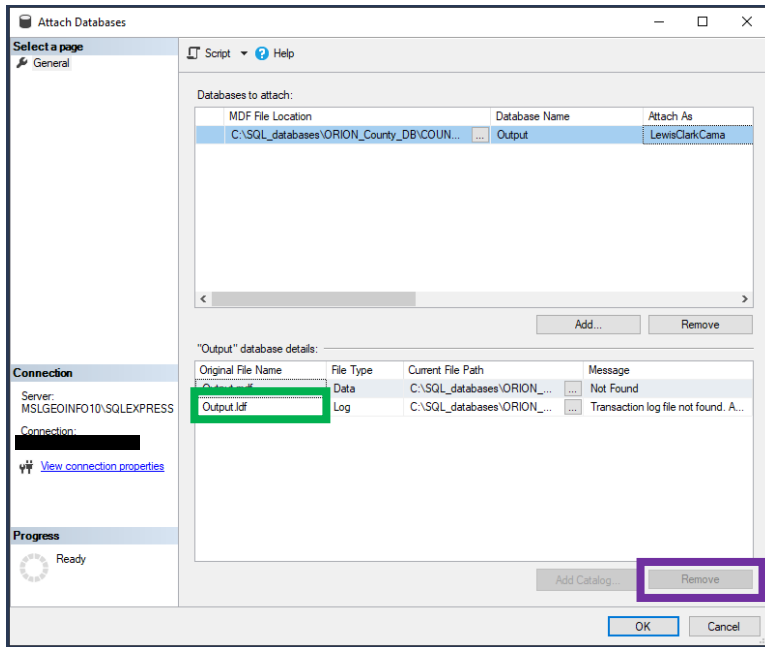
- g. Click on the box outlined in red. This will take you back to your original local database folder. Click **on the file with the .mdf extension** – in this case we had called the file **LewisClarkCama.mdf** and click **Ok**.
- h. At this point your screen should look like the following screen below:



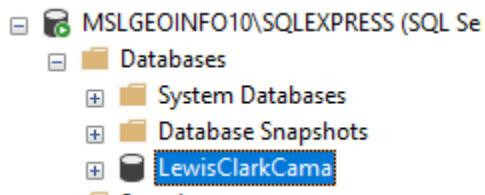
- i. Click on the **Output** box, highlighted in red (below) under the **Attach As** column and rename this to county name you're working with (i.e. LewisClarkCama).



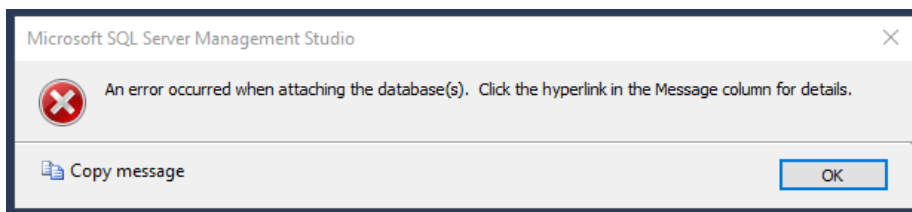
- j. Click on the **Output_log.ldf** box outlined in green. At this point there is no log file associated with the database. When you click on the box the **Remove** button highlighted by the purple box will activate. Click **Remove**. Click **OK**.



- k. If you expand your database folder on the left, you will see that the database is attached with the name you chose to rename the database in step 3d (or if you didn't rename it will be "Output").

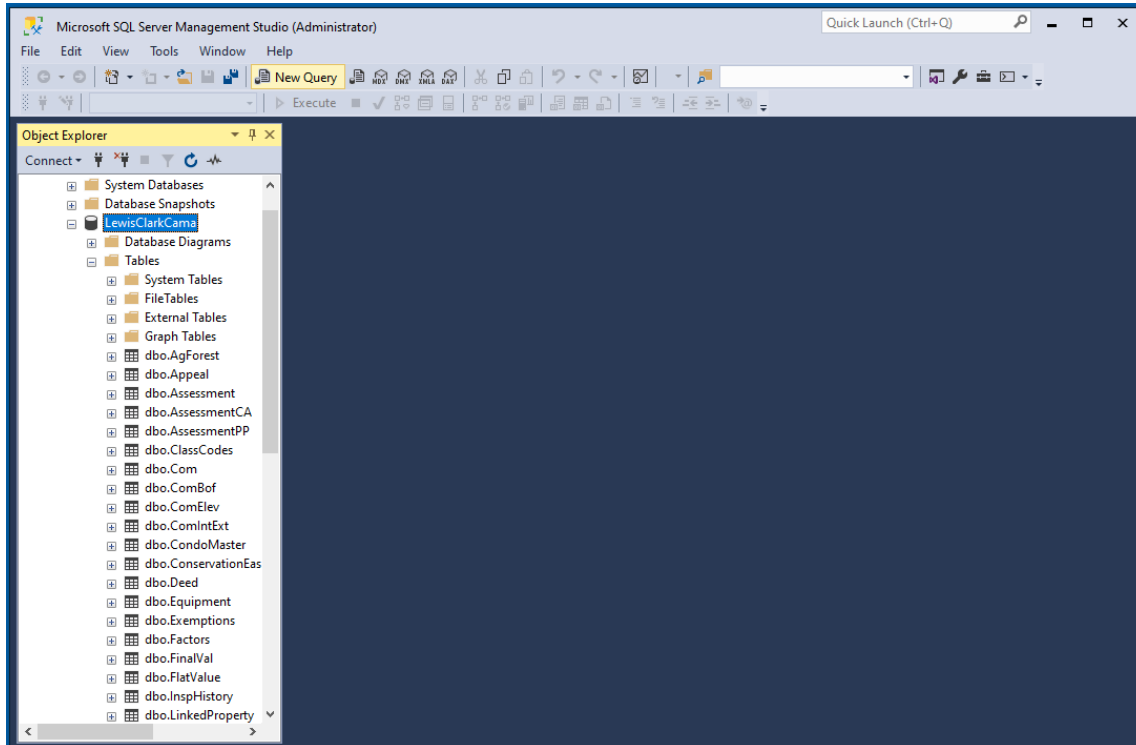


- l. If you encounter an error, like the error prompt below, it may mean you did not run the program as administrator, see **Step 1b**.

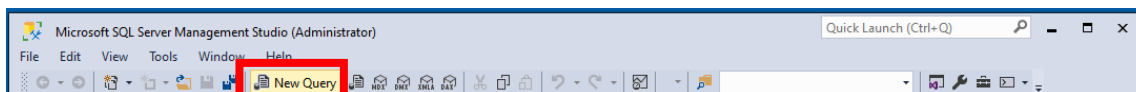


Opening the Database and Performing some Basic Queries

1. Within SQL Management Studio, expand the county database you just attached to by clicking the plus sign. Expand the Tables folder and you will see a list of database tables starting with **dbo.[table name]** (you can do this in left hand pane as shown or by double clicking the county database and Tables in the left-hand pane).



2. Right click on any of the tables and click on **Select top 1000 Rows**. The contents of the table will display in a manner similar to most databases you may be familiar with.
3. To create a simple query, click **New Query** on the toolbar (button is highlight in red below).



- a. When setting up a SQL statement, you always want to start with **Select * from [table]**. By putting this in the statement, it will select every column in the table. Unless you only want to display certain fields, then you wouldn't put an asterisk (*).
- b. An example of this is **Select * from Res**. If you are only connected to one database, it should auto-populated the 'Res' portion and know what table you're talking about. In other cases, you may need to lead with the database name (i.e. LewisClarkCama.dbo.Res) to complete the first line of the statement.


```
SQLQuery1.sql - M...STATE\ [REDACTED] * -p X
Select * from Res
```

i. If you hover over 'Res' it should spell out the full name of the table

```
SQLQuery1.sql - M...STATE\ [REDACTED] * -p X
Select * from Res
table LewisClarkCama.dbo.Res
```

c. Next, you need to add a 'Where' clause. This is prompting the SQL statement to ask basic questions and the results will provide in a table below. For example, if you want to know how many residential structures are built the year 2000 and after (meaning greater than or equal to), you could set up your where clause like this: **Where YearBuilt >= 2000 And TaxYear = '2022'**.

```
SQLQuery1.sql - M...STATE\ [REDACTED] * -p X
Select * From Res
Where YearBuilt >= 2000 And TaxYear = '2022'
```

d. Click **Execute** to view the results of query.
 e. Results will vary depending on the county database you have attached. Below is a screenshot of the results from the Lewis & Clark Cama database.

ResID	PropertyID	TaxYear	ResType	Style	Style_Desc	Grade	ClassCode	YearBuilt	EffectiveYear	StoryHeight	Atic	Atic_Desc	ExtWall	ExtWall_Desc	ExtWallFinish	ExtWallFinish_Desc	
1	424767230	547192	2022	MH	Double Wide	DW	G	6201	2020.000000	NULL	1.0	0	0 - None	Frame	NULL	5	5 - Maintenance Free Aluminum/Vinyl/Ste
2	334950757	511878	2022	SFR	08	08 - Conventional	6	3301	2014.000000	NULL	2.0	0	0 - None	1	1 - Frame	3	3 - Masonite
3	38235061	511887	2022	SFR	03	03 - Ranch	5	3301	2003.000000	NULL	1.0	0	0 - None	1	1 - Frame	3	3 - Masonite
4	419674454	511882	2022	SFR	03	03 - Ranch	5	3110	2004.000000	NULL	1.0	0	0 - None	1	1 - Frame	3	3 - Masonite
5	287634528	511883	2022	SFR	08	08 - Conventional	6	3301	2008.000000	NULL	1.0	3	3 - Fully Finished (40%)	1	1 - Frame	3	3 - Masonite
6	260597486	511867	2022	SFR	03	03 - Ranch	5	3301	2010.000000	NULL	1.0	0	0 - None	1	1 - Frame	3	3 - Masonite
7	414922301	511852	2022	SFR	08	08 - Conventional	5	3301	2011.000000	NULL	1.0	0	0 - None	1	1 - Frame	6	6 - Wood Siding or Sheathing
8	398527690	549123	2022	MH	Single Wide	SW	A	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	5	5 - Maintenance Free Aluminum/Vinyl/Ste
9	289600635	549122	2022	MH	Single Wide	SW	G	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	3	3 - Masonite
10	342416398	549130	2022	MH	Single Wide	SW	L	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	3	3 - Masonite
11	357571767	549133	2022	MH	Single Wide	SW	G	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	3	3 - Masonite
12	425114079	549175	2022	MH	Single Wide	SW	A	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	6	6 - Wood Siding or Sheathing
13	394613583	549177	2022	MH	Single Wide	SW	A	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	3	3 - Masonite
14	392669429	549179	2022	MH	Single Wide	SW	A	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	6	6 - Wood Siding or Sheathing
15	342516160	549205	2022	MH	Double Wide	DW	G	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	3	3 - Masonite
16	342502060	549202	2022	MH	Double Wide	DW	G	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	3	3 - Masonite
17	342473244	549363	2022	MH	Single Wide	SW	G	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	5	5 - Maintenance Free Aluminum/Vinyl/Ste
18	492550149	549362	2022	MH	Single Wide	SW	G	6201	2000.000000	NULL	1.0	0	0 - None	Frame	NULL	1	1 - Masonite

Query executed successfully. MSLGEOINFO10.SQLEXPRESS (15... STATE [REDACTED] LCCama 00:00: 8,091 rows

f. As you can see from the above table, there are 8,091 rows, which means there are that many houses built the year 2000 and later.
 g. Continue to add to this query if you wanted to know how many of those residents where single-family homes which the code within the database is 'SFR'.

```
SQLQuery1.sql - M...STATE\cwb374 (54)* -p X
Select * From Res
Where (YearBuilt >= 2000 And ResType = 'SFR' And TaxYear = '2022')
```

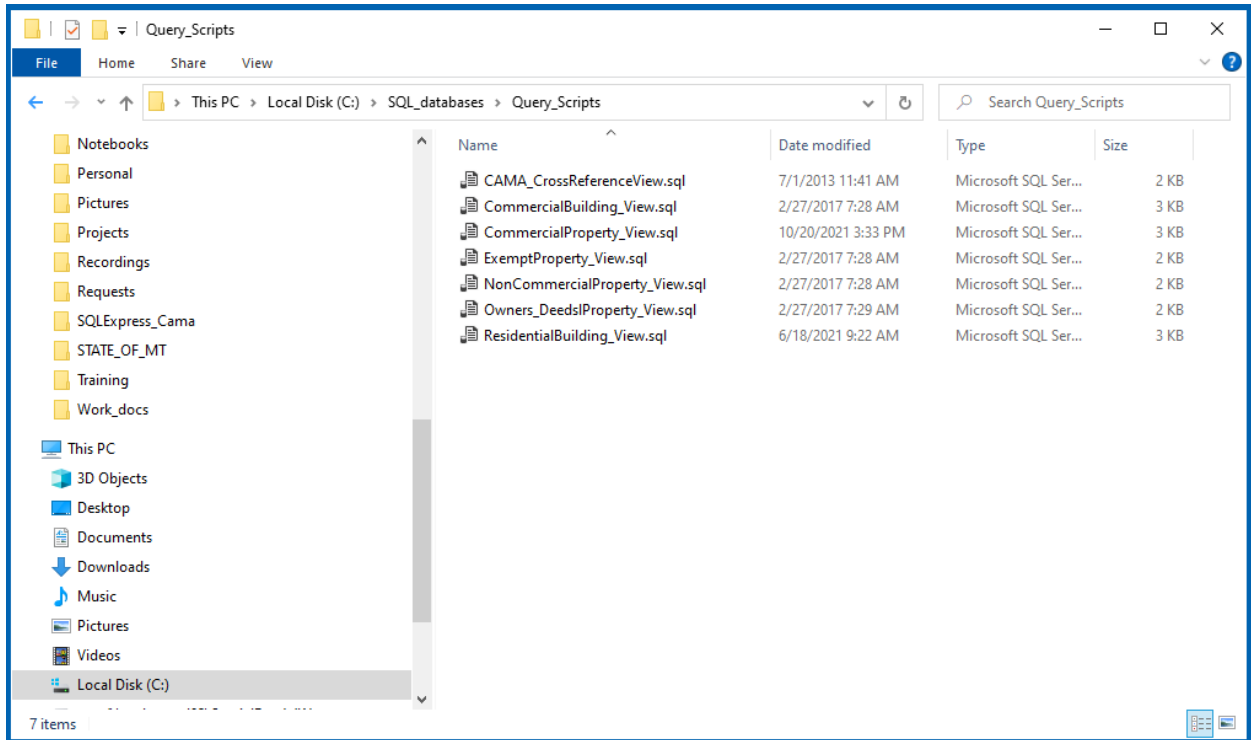
h. Expanding on this query further, if you wanted how many houses were built the year 2000 and later, that were a single-family home and had a metal roof.

- i. For additional help on creating additional SQL statements, see the [SQL Helpful Resources](#) section on the last page of these tutorial.

```
SQLQuery1.sql - M...STATE\cwb374 (54))*  X
Select * From Res
Where (YearBuilt >= 2000 And ResType = 'SFR' And RoofMaterial_Desc ='5 - Metal') And TaxYear = '2022'
```

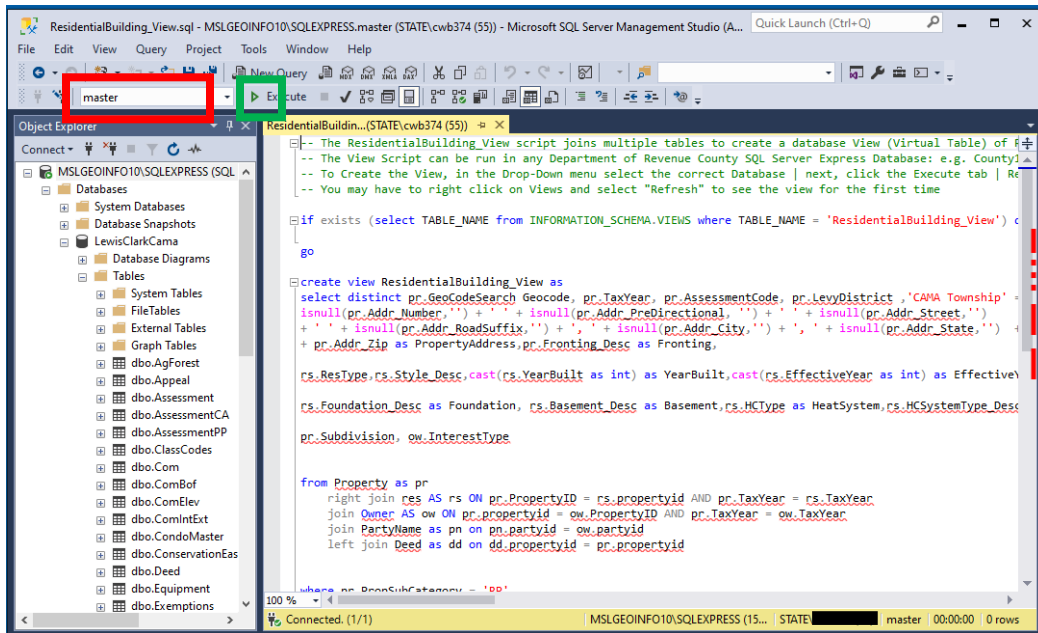
Creating a Database View

1. There are two purposes for creating a database view: (1) is to limit the number of fields that you see with the results table and (2) is to join other tables together and pull off certain fields that you are interested in for a property or building.
2. The Montana State Library provides for download a small number of “canned” database views. If you downloaded the **BEGINHERE.zip** you should already have a Query_Scripts folder. If you do not already have this folder, download the **QueryScripts.zip** on the [Montana State Library FTP](#).
3. In either scenario you acquired the query scripts, copy the **.sql files** (should be seven files) into your **Query Scripts** folder that you created in Downloading Data Files > Step 2.

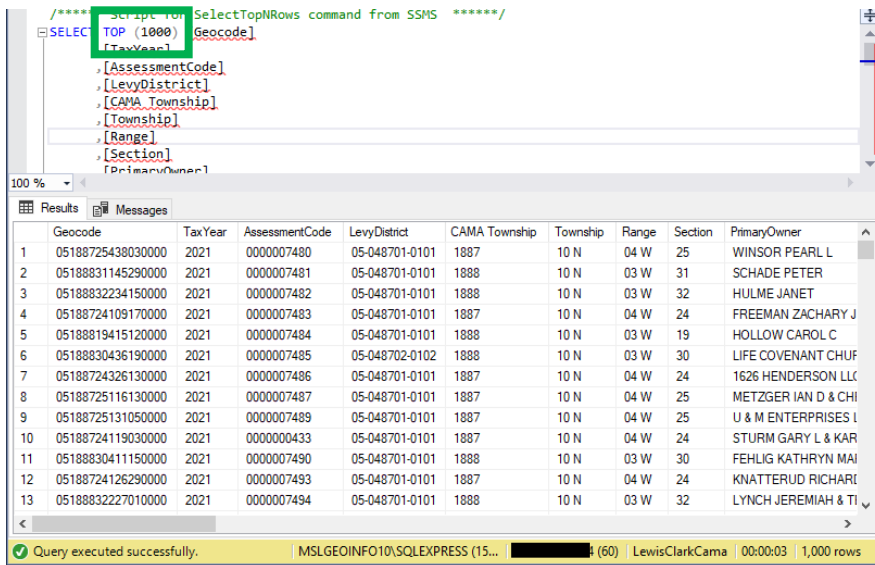


4. For this example, we will import the **ResidentialBuilding_View.sql** file. Within SQL Management Studio, click **File>Open>File** and navigate to your Query_Scripts folder. Select the **ResidentialBuilding_View.sql** file or any of the other files if it suits your purpose better and click **Open**. At this point you may (ignore this warning if you do not) see the query with a lot of red underlines as in the screenshot below. The red underlines

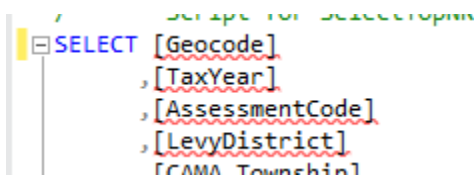
indicate an error in the query. That is because the query is not attached to your county database but to the master database (see red box).



5. Click the dropdown arrow where you see “master” and change it to your county database. The red underlines should disappear indicating that the script is good to run. Click **Execute** – the green box on the screenshot above. You should see a message that says **Command(s) completed successfully**.
6. A new view table is created from the previous result. Expand the Views folder to see **dbo.Residential_View**. If you don’t see this view table, right-click on the Views folder and click Refresh.
7. Right-click on the **dbo.Residential_View** and click on **Select Top 100 Rows** to open it. This view shows information about every residential building that the Department of Revenue has information on for the county.

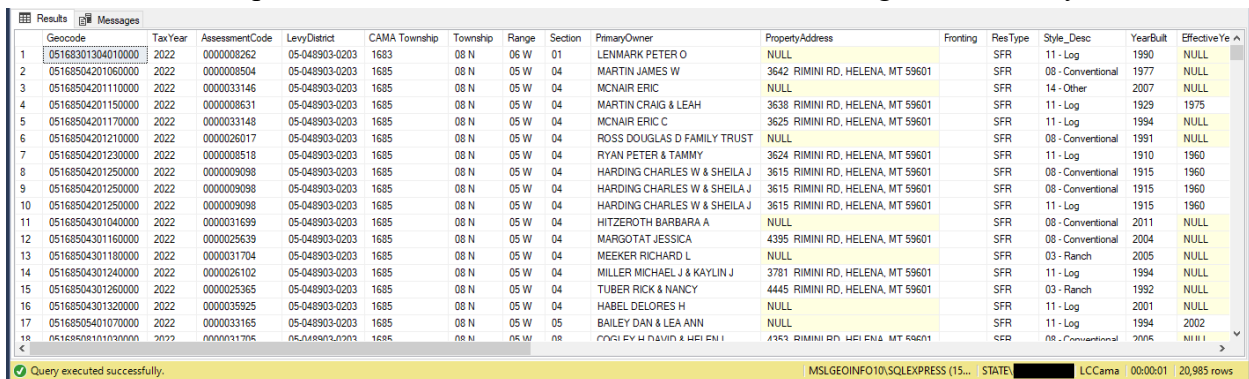


8. To open the entire results for the residential building view, change the query within green box you see in the upper screenshot. Remove **TOP (1000)** from the SQL statement, similar to the screenshot below.



9. Click **Execute** to view the results.

10. In the example above, the total number of residential buildings in the county are **20,985**.



11. Similar to the example outlines in the previous section, “Performing some basic queries”, you can add to this script to answer certain questions.

12. The question you may want answered is how many residential structures were built before 1970, have 3 or more bedrooms and do not have a metal roof.

```

SQLQuery2.sql - M...STATE ResidentialBuildin...(STATE\cwb374 (55))
, [Basement]
, [HeatSystem]
, [HeatType]
, [HeatFuel]
, [Subdivision]
, [InterestType]
FROM [LewisClarkCama].[dbo].[ResidentialBuilding_View]
WHERE YearBuilt < 1970 AND Bedrooms >= 3 AND RoofMaterial <> '5 - Metal'

```

13. The table returned **4,059** records

Geocode	TaxYear	AssessmentCode	LevyDistrict	CAMA Township	Township	Range	Section	PimayOwner	PropertyAddress	Fronting	ResType	Style
05178101301050000	2022	0000008787	05-048903-0203	1781	09 N	05 W	01	KAUFFMAN MICHAEL A & KYLA C	1532 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178101401010000	2022	0000008135	05-048903-0203	1781	09 N	05 W	01	BAKER MARK A & DEVLIN BAKER JENNIFER	1561 COLORADO GULCH DR, HELENA, MT 59601		SFR	11-
05178101401050000	2022	0000008261	05-048903-0203	1781	09 N	05 W	01	DOYLE THOMAS & TAMMIE J	1480 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178101401130000	2022	0000024181	05-048903-0203	1781	09 N	05 W	01	JOHN THOMAS C & AUTUM	1462 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178103201190000	2022	0000008272	05-048903-0203	1781	09 N	05 W	03	KUNTZ MATTHEW JOHN & MARINA ALEKSANDROVNA	1323 RIMINI RD, HELENA, MT 59601		SFR	11-
05178112103060000	2022	0000026962	05-048903-0203	1781	09 N	05 W	12	ULLREY JEFF & TRACY	1735 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178112103070000	2022	0000008484	05-048903-0203	1781	09 N	05 W	12	BURGOYNE JAMES A & KRISTIN L HAN	1695 COLORADO GULCH DR, HELENA, MT 59601		SFR	11-
05178112104030000	2022	0000009114	05-048903-0203	1781	09 N	05 W	12	BUFFALO DANIEL ETAL	1722 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178112105030000	2022	0000008220	05-048903-0203	1781	09 N	05 W	12	SIMPSON KAREN L TRUST	1632 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178112105050000	2022	0000008912	05-048903-0203	1781	09 N	05 W	12	PASSAMANI JOSEPH C & JACQUELINE G	1610 COLORADO GULCH DR, HELENA, MT 59601		SFR	06-
05178112401030000	2022	0000008744	05-048903-0203	1781	09 N	05 W	12	NICKEL STEVEN G CO-TRUSTEE & SUCCESSOR TRUSTEE	1930 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178112401060000	2022	0000004053	05-048903-0203	1781	09 N	05 W	12	AHMANN RICHARD A & JENNIFER L	1890 COLORADO GULCH DR, HELENA, MT 59601		SFR	05-
05178112401070000	2022	0000008257	05-048903-0203	1781	09 N	05 W	12	DOUGLAS ROBERT G & DONNA LEE	1866 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178112401090000	2022	0000009167	05-048903-0203	1781	09 N	05 W	12	PUTNAM KAREN K & STANLEY R	1852 COLORADO GULCH DR, HELENA, MT 59601		SFR	02-
05178112402110000	2022	0000008825	05-048903-0203	1781	09 N	05 W	12	POWELL JAMES L	6081 POWELL RD, HELENA, MT 59601		SFR	08-
05178112402170000	2022	0000008068	05-048903-0203	1781	09 N	05 W	12	DYLL JOYCE MTRUSTEE	1851 COLORADO GULCH DR, HELENA, MT 59601		SFR	11-
05178112402230000	2022	0000008553	05-048903-0203	1781	09 N	05 W	12	FIELD CHRISTOPHER A & MICHELLE	1813 COLORADO GULCH DR, HELENA, MT 59601		SFR	08-
05178112401080000	2022	0000028898	05-048903-0203	1781	09 N	05 W	12	ANDERSON SCOTT B & NEER &	6168 MONTE CREEP DR, HELENA, MT 59601		SFR	08-


SQL Helpful Resources

1. W3Schools - SQL Tutorial: <https://www.w3schools.com/sql/>
2. Codecademy - Learn SQL: <https://www.codecademy.com/learn/learn-sql>
3. Learn SQL: <https://learnsql.com/>
4. Khan Academy - Intro to SQL: <https://www.khanacademy.org/computing/computer-programming/sql>
5. SQLZoo: https://sqlzoo.net/wiki/SQL_Tutorial

Contact Information

I'd like to thank you for going through this tutorial document and I hope you found it helpful. If you have any additional questions, feel free to reach out to me and I'd be happy to set up a teleconference meeting to answer your questions or to discuss potential solutions you may be experiencing. My contact information is below:

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