



Exercise 8: Querying Data

In this exercise you will learn how to perform queries in QGIS including selections and structured query language (SQL) queries. A query is a useful way to better understand your data and to answer questions with your data.

Section 1: Use Identify Feature Tool

The *Identify Features*  button allows you to see attribute information about a feature in a layer.

1. Navigate to the \\Vietnam_Training\04_Exercises\Project_Files folder and locate VNM_Querying_Data.qgs
2. Double click VNM_Querying_Data.qgs to open and display the map
3. On the toolbar select the *Identify Features*  button
4. Make sure that the VNM_adm1 layer is highlighted in the *Layer Panel*

Note: The *Identify Feature* tool will always provide you with information for whichever layer is highlighted in the *Layer Panel*. Therefore, you must check to make sure that the layer of interest is highlighted.

5. Click on a region on your map. A dialog box will open that lists all the attributes for that region
6. Click on one of the cities

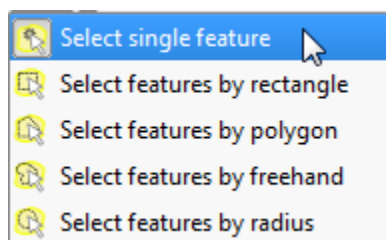
Note: What happened? Did you get the attribute data for the region instead of for the city? Make sure that the VNM_populatedPlaces_ne10m layer is selected in the *Layer Panel*. Also, make sure that when you click, the mouse arrow is at the center of the city point on the map.

7. Close the *Identify Results* box

Section 2: Spatial Selection

There are two ways to select features, spatially or by attribute. This section will show you how to select individual features or multiple features spatially

1. On the toolbar, click the *Select Single Feature*  button



2. Make sure that the VNM_adm1 layer is highlighted in the *Layer Panel*

Note: The *Selection* tool will only select features from the layer highlighted in the *Layer Panel*. Therefore, you must check to make sure that the layer of interest is highlighted.

3. Click on a region on your map. The region will turn a different color (yellow is the default setting)

4. Click on a different region

Note: What happened? The original region is no longer highlighted. The newly selected region should now be highlighted.

5. Click on a new region

6. Hold the *CTRL* key and select several other regions. Now several regions should be selected

7. Click the *Deselect Features from all Layers*  button

Section 3: Exploring Attributes

Select by attribute requires some understanding of the data available in the attribute table and the way in which the data is represented.

1. Double click the *VNM_adm1* layer in the *Layer Panel*

2. Click on the *Fields*  *Fields* tab in the *Layer Properties* dialog box

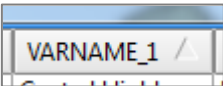
Note: In the box, you will see the information about each attribute in the attribute table. These are descriptions of the attribute categories i.e. column names, type (string, integer, or real), length, and precision (number of decimal places).

3. Close the *Layer Properties* dialog box

Make sure that the *VNM_adm1* layer is highlighted in the *Layer Panel*

4. Click the *Open Attribute Table*  button on the toolbar

Note: You can also access the dialog box by right clicking the layer in the *Layer Panel* and clicking *Open Attributes Table*.

5. Click the *VARNAME_1*  header in the *Attribute Table*

Note: This will reorder the rows so that they are in alphabetical order starting with A. If you click the header again, it will reverse the sort order.

6. Click the *Shape_Area* header

Note: This will reorder the rows so that they are in numerical order from smallest to largest. If you click the header again, it will reverse the sort order.

- Make sure the *VARNAME_1* arrow is pointing up (alphabetically arranging regions starting with A) and select *North East*, *North West*, and *Red River Delta* by clicking and holding the left mouse button as you drag it across the gray numbers on the far left of the table

Attribute table - VNM_adm1 :: 3 / 8 feature(s) selected

	ID_0	ISO	NAME_0	ID_1	NAME_1	VARNAME_1 /	NL_NAM
0	241	VNM	Vietnam	3296	Tây Nguyên	Central Highlan...	NULL
1	241	VNM	Vietnam	3291	đ?ng b?ng s?n...	Mekong River ...	NULL
2	241	VNM	Vietnam	3289	B?c Trung B?	North Central C...	NULL
3	241	VNM	Vietnam	3290	Đ?ng B?c	North East	NULL
4	241	VNM	Vietnam	3295	Tây B?c	North West	NULL
5	241	VNM	Vietnam	3292	Đ?ng B?ng S?n...	Red River Delta	NULL
6	241	VNM	Vietnam	3294	Nam Trung B?	South Central C...	NULL
7	241	VNM	Vietnam	3293	Đ?ng Nam B?	South East	NULL

Look for in ID_0

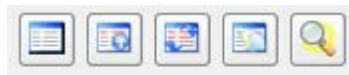
☐ Show selected only ☐ Search selected only ☒ Case sensitive

Note: You can also select in the *Attribute Table* by clicking the first row and holding the *SHIFT* key then clicking the last row in a continuous selection. For a non-continuous selection, hold the *CTRL* key and click each row that you want to select. To unselect something in the table hold down the *CTRL* key and click the *row number*.

- Check the box for *Show Selected Only* ☒ *Show selected only* (located in the bottom left of the dialog box)

Note: What happened? You should see only the selected rows

- Uncheck the box for *Show Selected Only*
- Explore the use of the other select tools in the *Attribute Table* (at the bottom left of the dialog box)

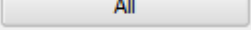


- Close the dialog box by clicking on the X in the upper right corner

Section 4: Selection by Attribute Using Advanced Search

Advanced Search in QGIS allows you to select features using structured query language (SQL) with clause operators such as equal to and greater than. This is important for querying data and making new layers.

- Open *Attribute Table* for *VNM_populatedPlaces_ne10m* layer
- Click *Advanced Search*
- Double click *FEATURECLA* in the *Fields* box. That field will appear in the *SQL Where Clause* box.

4. Click  in the *Values Area*. The names of all the feature type classifications appear in the values box.

5. Click the *equal sign* in the *Operators area*. 

6. Double click 'Admin-0 capital' in the *Values area*.

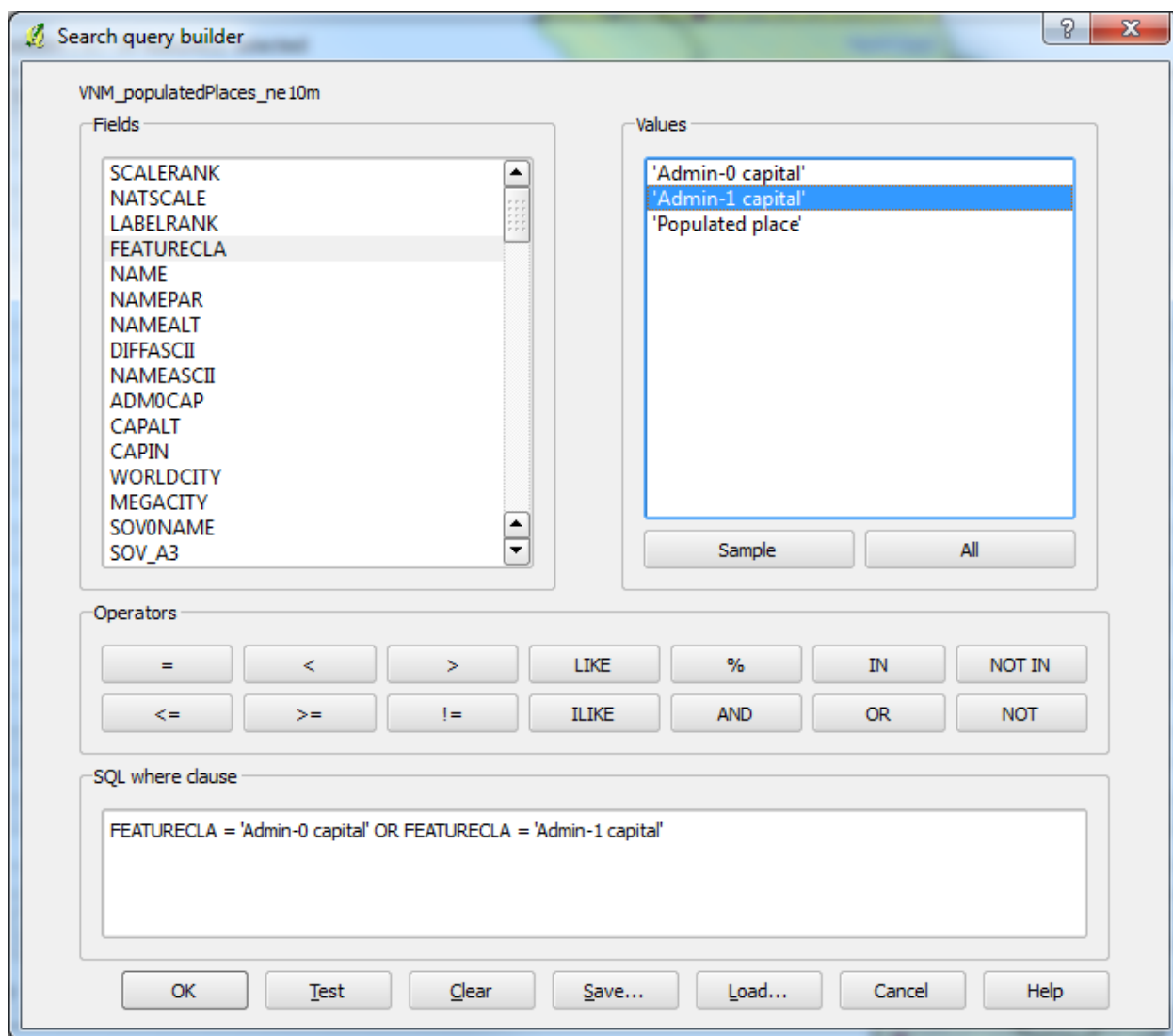
7. In the *Operators area*, click the OR button. 

8. Double click *FEATURECLA* in the *Fields box*.

9. In the *Operators area*, click the equal sign. 

10. Double click 'Admin-1 capital' in the *Values area*.

The *Search Query Builder* should look like the example below.



11. Click *Test*.

A dialog box should appear that tells you that 49 matches were found.

12. Click *OK*.

13. Clear the *SQL Where Clause* box.

14. Enter the following in the *SQL Where Clause* box by typing or using the operators.

FEATURECLA != 'Populated place'

15. Click *Test*.

16. Click *OK* in the *Search Results* dialog box.

17. Click *OK* in the *Search Query Builder* dialog box.

You will now see 49 cities highlighted in the *Attribute Table*. The highlighted cities are those with a feature class that is not 'Populated place'. Therefore, the highlighted cities are those with a class of either 'Admin-0 capital' or 'Admin-1 capital'.

18. Close the *Attribute Table* using the X in the upper right corner.

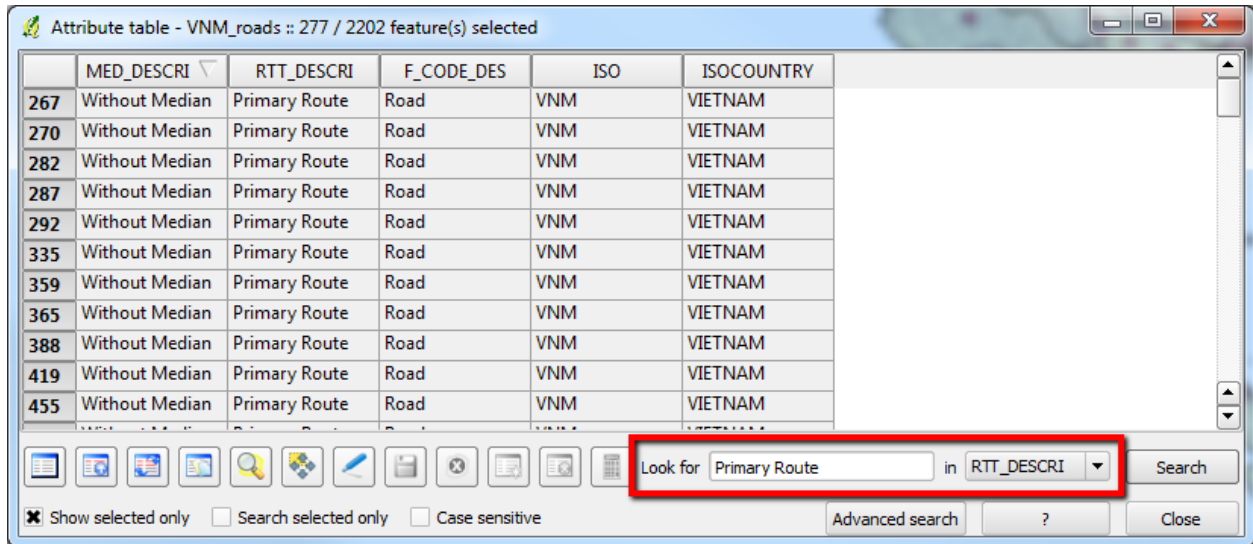
Note: Look for the selected on the map? Where are they located?

19. Clear the selection using the *Deselect All Features from Layer*  button

Section 5: Create a New Layer from a Selection

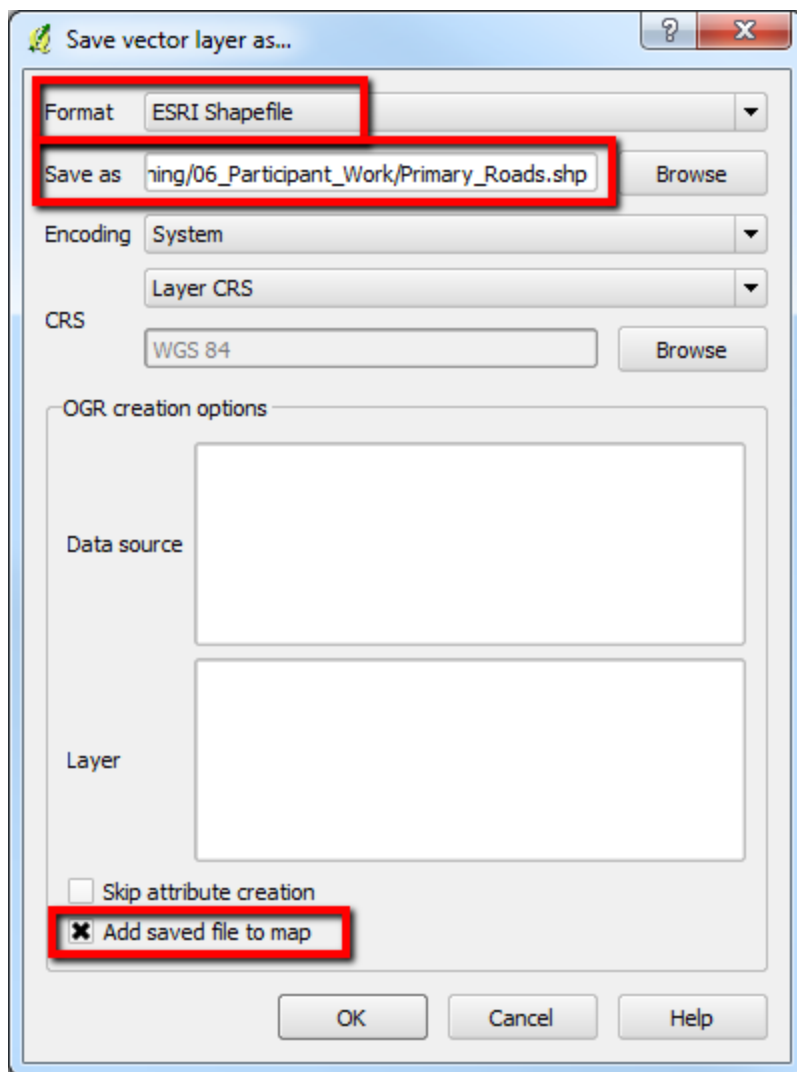
Sometimes you want to create a new layer with the information you have selected. This might be used for further querying or for display purposes.

1. Open the *VNM_roads* layer's *Attribute Table*.
2. Uncheck the box next to *Case Sensitive*.
3. Type *Primary Route* in the bottom right corner in the *Look For* box.
4. In the drop down, select *RTT_DESCR1*.



5. Click *Search*.
6. Click the *Show Selected Records Only* box in the bottom left of the dialog. This will show the *Attribute Table* with only the selected rows.
7. Close the *Attribute Table* using the X in the upper right corner.
8. Click *Layer > Save Selection as Vector File...*
9. Make sure the format is *ESRI Shapefile*.
10. Navigate to `\\Vietnam_Training\06_Participant_Work` and name the file "Primary_Roads".
11. Check the box next to *Add Saved File to Map*.


The *Save Vector Layer As...* window should look like the example below.



12. Click *OK*.

13. Click *OK*.

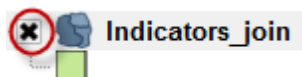
Section 6: Attribute Calculation

The *Field Calculator*  button allows you to make calculations in the *Attribute Table* on a single column or using multiple columns.

1. Add your previously created *Indicator_Join* layer

\\Vietnam_Training\06_Participant_Work\Indicator_Join.shp

2. If necessary, click the box next to *Indicators_Join* to turn the layer on



3. Open the *Attribute Table* for the *Indicators_Join* layer

4. Click the *Toggle Editing Mode*  button

WARNING: This activates the editing mode. You can change the attributes and geometry. You might want to save your layer as a new layer before performing any edits. Once you save your edits, you cannot go back to a previous version of the layer unless you have another copy of it saved.

5. Click the *Open Field Calculator*  button

6. Type “Perc_Fe_10” in the *Output Field* name box

Note: If the *Output Field* options are greyed out, uncheck the box that says *Update Existing Field*. The *Output Field* area will now be active.

7. Change the *Output Field Type* to *Decimal Number (real)*

8. Set the *Output Field Width* to 5

9. Set the *Output Field Precision* to 2

Note: The number of digits in output will be 3 before the decimal point and 2 after or ‘000.00’.

10. Click the plus sign next to *Fields and Values*  *Fields and Values* under *Function List*

11. Scroll down to the *Average Fe* field

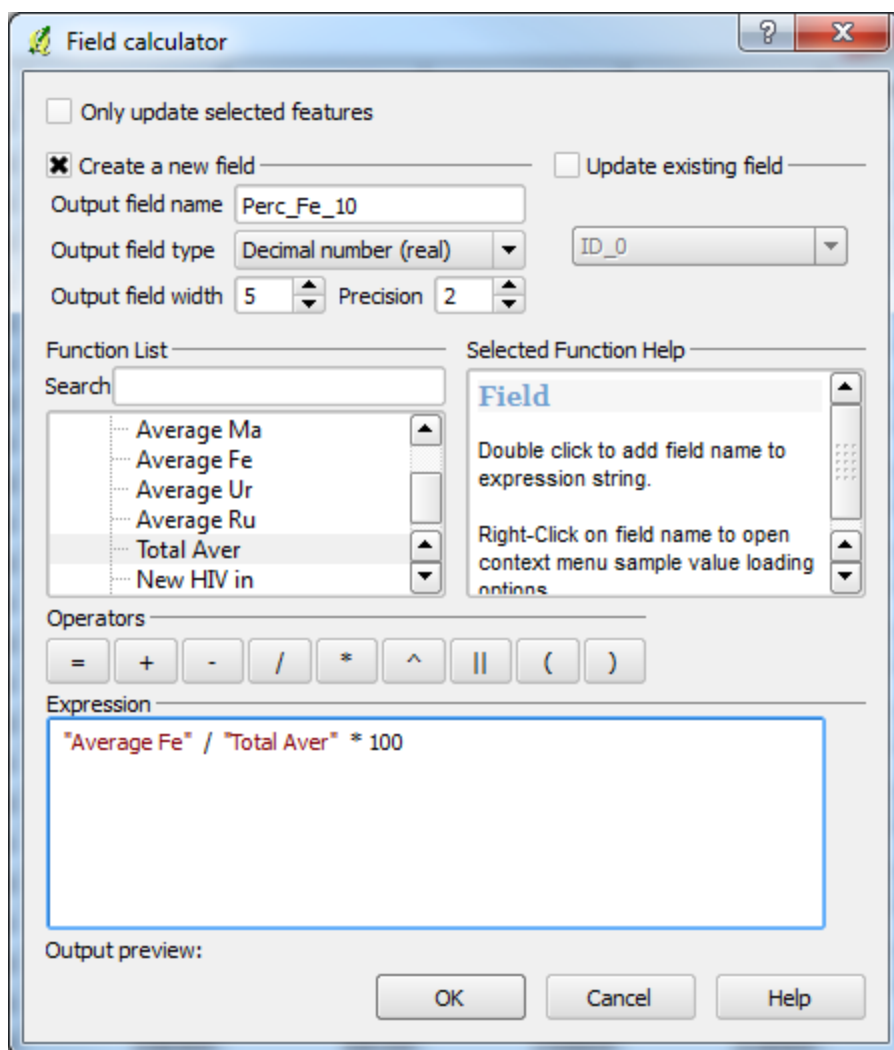
12. Double click the *Average Fe* field. It will appear in the *Expression* box

13. Type (or use the operator buttons) to add the division symbol in the *Field Calculator Expression* box

14. Double click the *Total Aver* field

15. Type (or use the operator buttons) to add the multiplication symbol in the *Field Calculator Expression* box and then type 100

The *Field Calculator* dialog box should now look like the example below




16. Click *OK*

The new field will appear in the last column of the *Attribute Table*

Note: What is the value? What does this mean?

Note: If you make a mistake when creating a new column or calculating the attribute, you may delete the

unwanted column(s) by clicking the *Delete Column*  button. In the *Fields* tab, scroll down to the field you want to delete and click on it so it is highlighted in blue. Click to select the field you would like to remove from the window that appears. Click *OK*.

Note: You must be in editing mode in order to delete columns.

17. Click on *Toggle Editing Mode*  button to exit the editing session

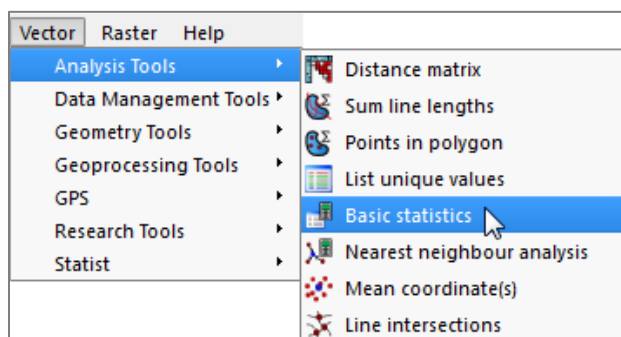
18. When prompted, click *Save*

19. Close the *Attribute Table*

Section 7: Layer and Selection Summary Statistics

Understanding the overall summary statistics of an attribute can assist in determining proper categorization of the data and better understanding of the data you are using.

1. Click **Vector>Analysis Tools>Basic Statistics**



2. Select *Indicators_Join* in the *Input Vector Layer* field
3. Select *Perc_Fe_10* in the *Target Field*
4. Click **OK**

Note: The window will populate with the summary statistics for the female percentage of the population for each Province.

5. Close the window using the X in the upper right corner
6. Exit QGIS without saving

End Exercise.

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