

QGIS Practical 2: Advanced vector symbology - part 1

This practical exercise will demonstrate some advanced vector symbology settings, called “categorical symbology,” which allow you to assign different symbols on the basis of different categories in a dataset.

This will build on the work done in the previous practical, and form the basis of an actual administrative map. We will learn how to symbolise the settlements according to what type of settlement they are, and how to group the many road categories into a few simpler ones.

1.0 Getting Started

1. Open your Administrative Map QGIS project **OR**
 1. Open a new project and add:
 - The Admin 1 layer: `grd_admn_ad1_py_s1_gadm_pp_parish.shp` in `GIS\2_Active_Data\201_admn`
 - The Settlements layer: `grd_stle_stl_pt_s3_osm_pp_settlements.shp` in `GIS\2_Active_Data\213_stle`
 - The Roads layer: `grd_tran_rds_ln_s0_osm_pp_roads.shp` in `GIS\2_Active_Data\214_tran`
 2. For the time being, uncheck the roads dataset, in case it slows down your machine.

2.0 Filtering data: settlements

When creating a new map product, you will often need less data than what is contained in the dataset. Both your settlement and your road datasets are very busy and contain minor towns and roads that you will likely not need for a national-scale map.

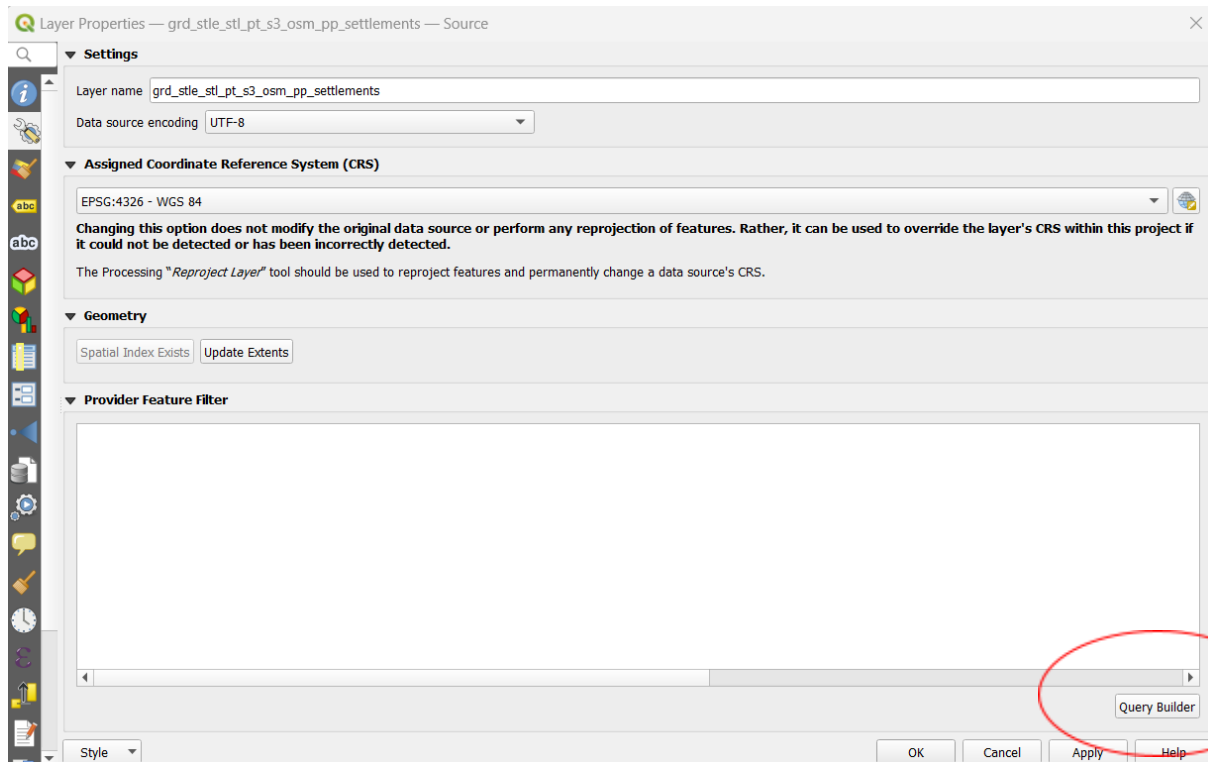
In this next example, we will select only the main settlements we want to keep on the map and hide the ones we are not interested in visualizing. They won't be deleted from the dataset, they will only be deselected and so invisible in this particular map project.

3. Right-click on the settlement layer: `grd_stle_stl_pt_s3_osm_pp_settlements.shp` and select **Open Attribute Table**

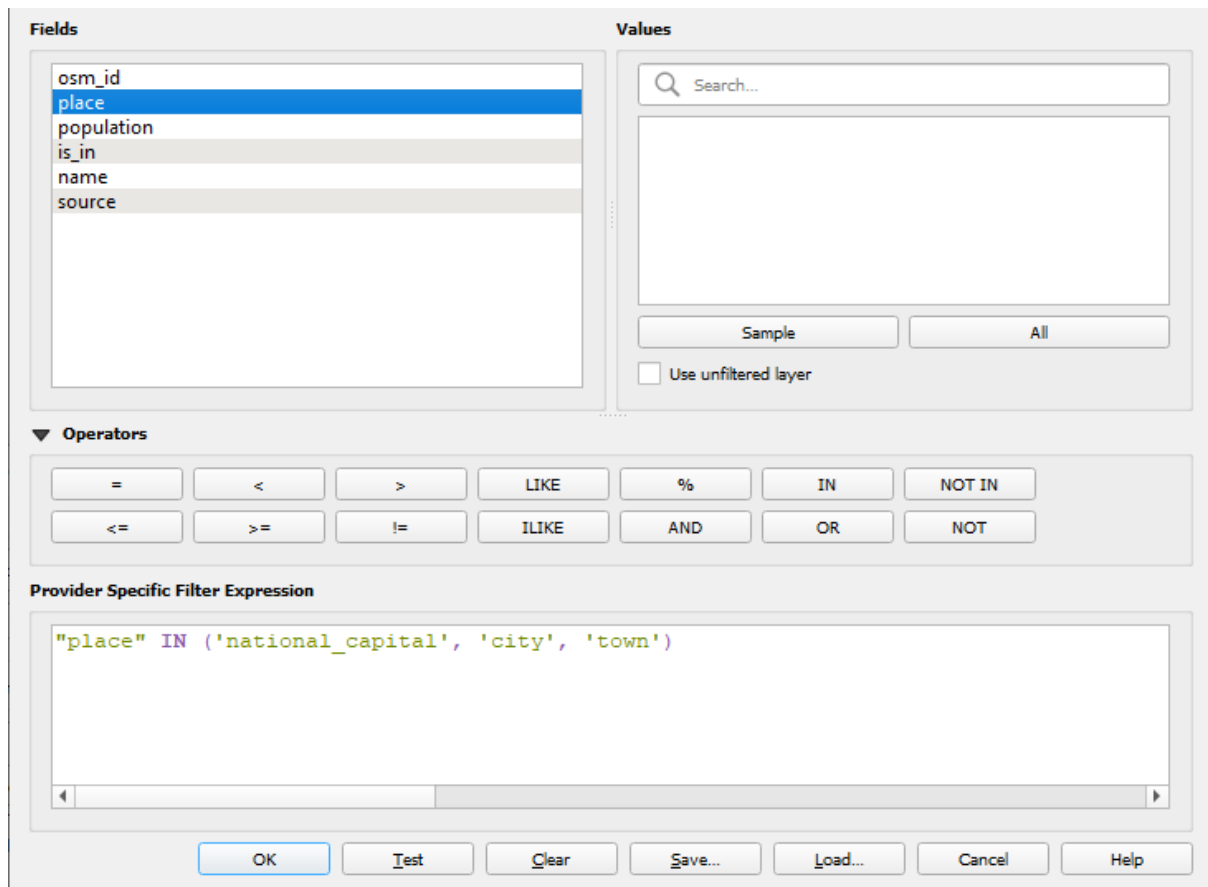
- Take a moment to study the attribute table for the settlements layer and try to understand which attributes (so, which column) could be used for distinguishing between different settlement types – could it be the attribute **place**?

We will use a definition query to filter the data so that it will only show settlements that have the **place** attribute **national_capital**, **city**, and **city**:

- Open the **Layer Properties** for `grd_stle_stl_pt_s3_osm_pp_settlements.shp` and under **Source** click on **Query Builder**.



- Click on **place** in the list of fields then under Values click **All** to visualize all the categories contained in the field called **place**
- Enter the expression:
"place" IN ('national_capital', 'city', 'town')



Fields

- osm_id
- place**
- population
- is_in
- name
- source

Values

Search...

Sample All

Use unfiltered layer

▼ Operators

= < > LIKE % IN NOT IN

<= >= != ILIKE AND OR NOT

Provider Specific Filter Expression

```
"place" IN ('national_capital', 'city', 'town')
```

OK Test Clear Save... Load... Cancel Help

- o Click **OK**

3.0 Categorical symbology: settlements

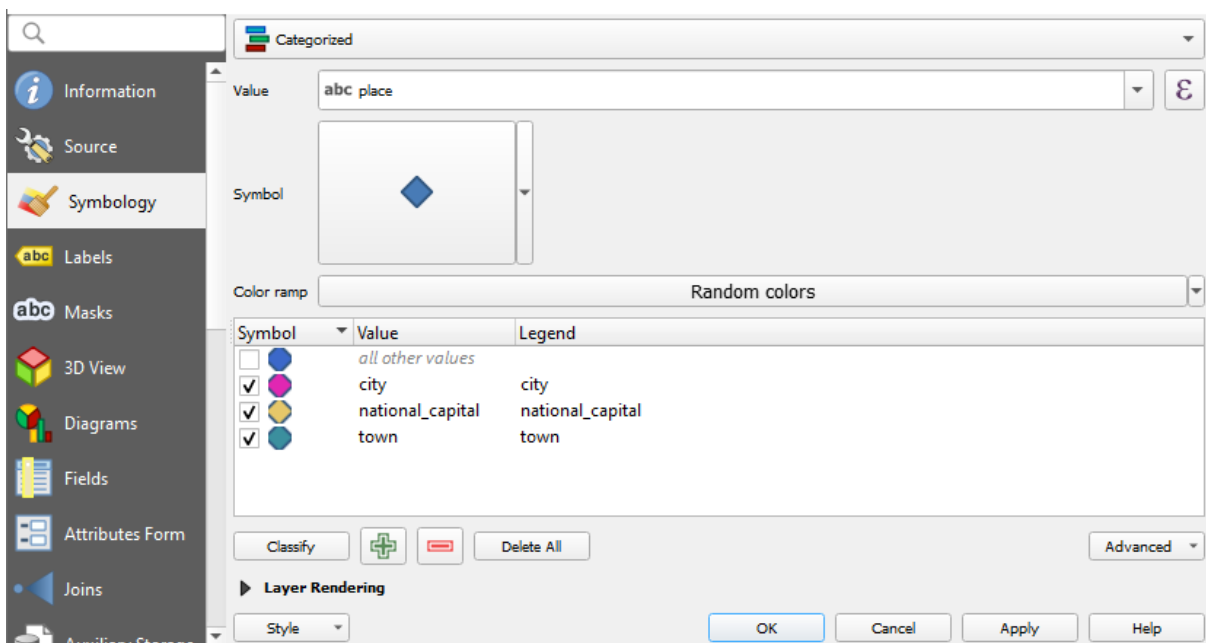
On your map, you will notice how the number of points, and settlements, decreased. These are towns, cities, and the capital city.

It would now be useful to be able to recognize what type of settlement they are by using a different symbol. That is what we will do now with categorical symbology.

- In the **Layer Properties** of the Settlements dataset, which you can access by right-clicking on the layer and selecting **Properties**, click on **Symbology**.
 - o At the top of the window change the setting from **Single symbol** to **Categorized**.
 - o In the **Value** field select the attribute **place** - the attribute field we will use to distinguish our settlements.
 - o Press on the **Classify** button. Entries will now appear from the **place** attribute with the values **national_capital**, **city**, and **town**, and an entry for **all other values**.

- o We do not need the entry for *all other values*. Highlight that entry and click




on  to remove it




7. Now we can define symbols for our three different settlement types. Think about the hierarchy of the settlements when defining symbols. Larger more important settlement types should have larger or bolder symbols.

- o Double-click on the existing symbol for `national_capital` to bring up the **Symbol Selector** where we can change the symbology.

We will use two **Simple markers** to build our symbol:

- o For the first symbol click on the white dot 
- o Click on  to add another symbol
- o Change the **Fill** colour for this symbol to black and the size to 2.5
- o Click **OK** - the symbol should look like this 
- o Click **OK**, then click **Apply** to see the changes on the map

Repeat the process for defining the symbols for cities and towns


- o For the cities, select the symbol dot white  and change the size to 2.5
- o For towns, simply change the fill colour to black and the size to 1.5
- o Remember to click **Apply** to see your changes on the map.

8. Rename the legend entries to something more user-friendly, e.g. change national_capital to **National capital**. Double-click on the label in the legend list to enable editing


3.1. Customised labels

In the same way that we can use different symbols used for different types of settlements, we will now also customise the labels. It is in fact good practice to have a larger label for the capital city, a medium-sized label for the cities, and a smaller-sized label for the towns. These choices help the final audience of the map quickly decipher what the various elements are, and what the relationships between those symbols are.

We will now create different rules that QGIS can use for labels when it encounters items of certain categories.

1. In the Layer properties select **Labels** on the right-hand side.
2. At the top change No labels to **Rule-based labelling**. Then click on  Add rule.


The **Edit Rule** window will open. We will first create a label for the national capital.


- o In the Description box type **National Capital**
 - o Next to **Filter** click on 
 - o For the filter we use an expression to select only the settlement with the attribute national_capital. In the expression box enter the expression:
"place" = 'national_capital'
 - o Click **OK**
3. From the drop-down list for **Value** select **name**. This is the field containing the values we want to appear on the labels

The last thing is to specify the text font, colour etc.

4. Specify the following parameters (you may need to scroll down the window and click on **Text** to see these options):
 - Font: Candara
 - Style: Bold
 - Size: 16
 - Colour: Black
 - o Click OK

We will now repeat the process for cities and towns.

5. Click on  Add rule, the **Edit Rule** window will open. We will now create a label for cities.
 - o For description type **Cities**

- o For the filter enter the expression:
"place" = 'city'
 - o Select the Value field to be **name**
 - o Change the font to:
 - Font: Candara
 - Style: Regular
 - Size:12
 - Colour: Black
 - o Click OK
6. Click on  Add rule, the **Edit Rule** window will open. We will now create a label for towns.
- o For description type **Towns**
 - o For the filter enter the expression:
"place" = 'town'
 - o Select the Value field to be **name**
 - o Change the font to:
 - Font: Candara
 - Style: Regular
 - Size: 8
 - Colour: Black
 - o Click OK
7. Click OK, close the layer properties window, and see your labels on the map.

Try applying a buffer around the labels to make them more clearly visible.

4.0 Grouping categories using SQL filters: roads

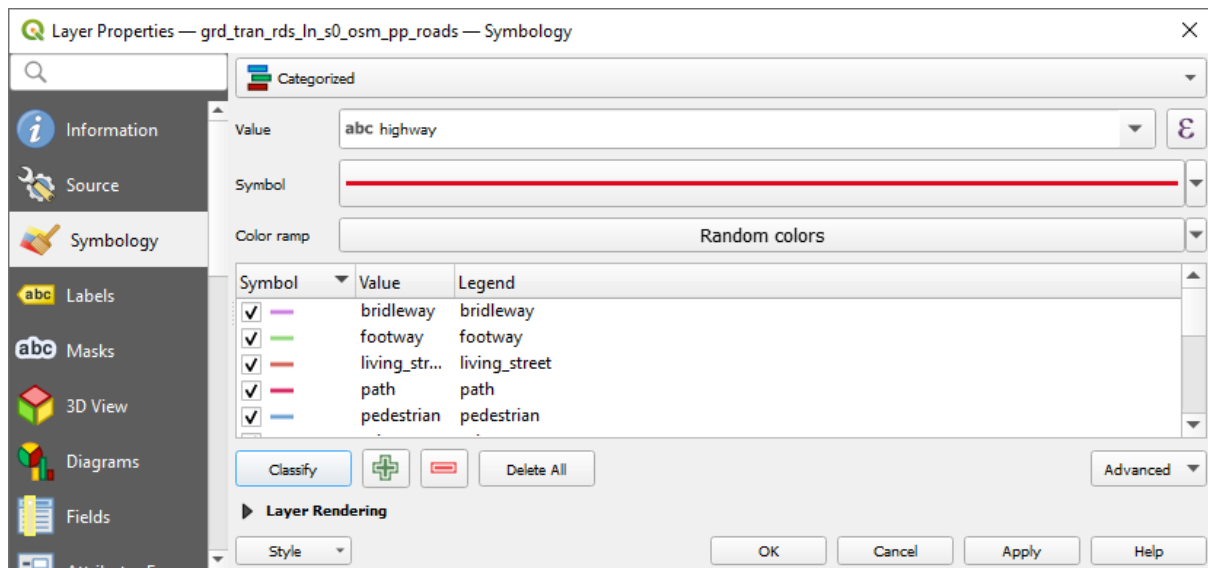
What about the road dataset? Check on the dataset to make it visible again, if it is not already. You will notice just how many roads there are, and similarly to the settlements, not all of them may be relevant to a national scale map.

1. Once again, open the attribute table for the roads layer to see which attributes (so, which column) could be used for distinguishing between different road types. You can do so by right-clicking on the roads dataset and selecting **Open Attribute Table**. This time we will use the attribute **highway**

We will now symbolize roads by different types, using SQL to simplify the categories.

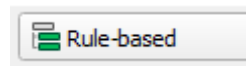
2. Right-click on the roads layer in the Layers list and select **Properties**
3. Click on **Symbology**
4. Click on the drop-down list that currently says Single Symbol and select **Categorized**



5. From the Value drop-down list select **highway**
6. Click **Classify**, then click **Apply**



Currently, there are many categories of roads and clearly differentiating between all of these on the map can be confusing. We will therefore now demonstrate how to group these into three simple categories: **main**, **minor**, and **other**.

7. Towards the bottom of the window click **Delete All** to remove the current classes that are listed
8. Click on the drop-down list that currently says **Categorized symbol** and select **Rule-based**



9. Click  to add a new rule
10. In the box next to **Label** type **Main**
11. In the Edit Rule window which appears next to Filter click 
12. Expand the options for Fields and Values then click on **highway**, then click on the **All Unique** button to list all of the possible values for highway

We will now enter an expression that selects all of the types of main roads (this includes primary and trunk roads)

13. To begin entering the expression we need double click on **highway** in the list of fields,
then type =
Double-click on **primary**
14. Click **OK**


15. Style the roads with a bold colour and thicker line (for example colour = red and stroke width = 0.66), then click OK [note you may need to scroll down the window to see the style options],

16. Click **Apply**

You should now see the main roads shown clearly on your map. In some circumstances, this might be all that you want to include. In this example, however, we will also add a category for minor roads and one for others (other will include residential streets, tracks, paths etc)

17. Click  to add a new rule

18. In the box next to **Label** type **Minor**

19. In the Edit Rule window which appears next to Filter click 

20. Enter the expression: "highway" IN('secondary', 'secondary_link', 'tertiary', 'tertiary_link')

21. Change the symbol to an orange line of 0.3 width

22. Click **OK**, **OK** then **Apply**

We are now ready to add the final category 'other'. In this case, it is not necessary to enter a rule as it will contain all remaining classes.

23. Click  to add a new rule

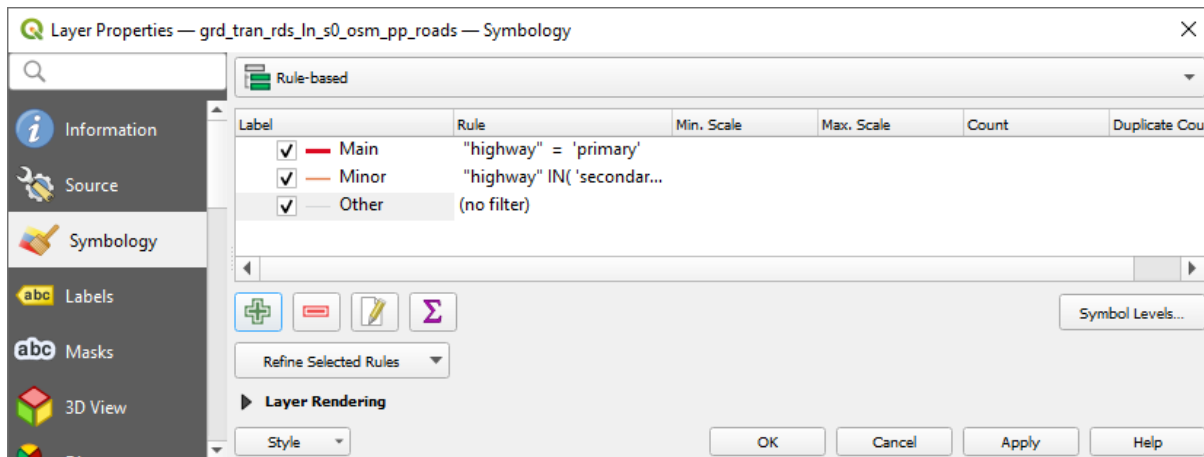
24. In the box next to **Label** type **Other**

25. Change the style for the line to be a thin grey line

26. Click **OK**, then click **Apply**

27. If you are happy with the appearance of the roads on the map click OK to close the Layer Properties window. Otherwise, change the colors and widths as desired before closing the window.

28. For this particular national map, you may want to uncheck the **Minor** and **Other** roads and only keep the **Main** ones visible on the map.



5.0 Saving a project

Saving a project allows you to return to it later and continue working on it.

1. From the project menu select **Save**
2. If it is the first time saving the project, use the menu prompted by QGIS to save the project within the folder GIS\3_Mapping\33_Map_Projects and change its name to call it **Administrative_Map**.

6.0 Summary

In this session, you explored how the choice of symbology can help enhance data interpretation, and show information using attributes. You also saw how to create a subset of data to work with through a filtering operation, and how to group many categories of a dataset into a few simpler ones.