Instructions: Using GIS to Map Protestant and Catholic Printing

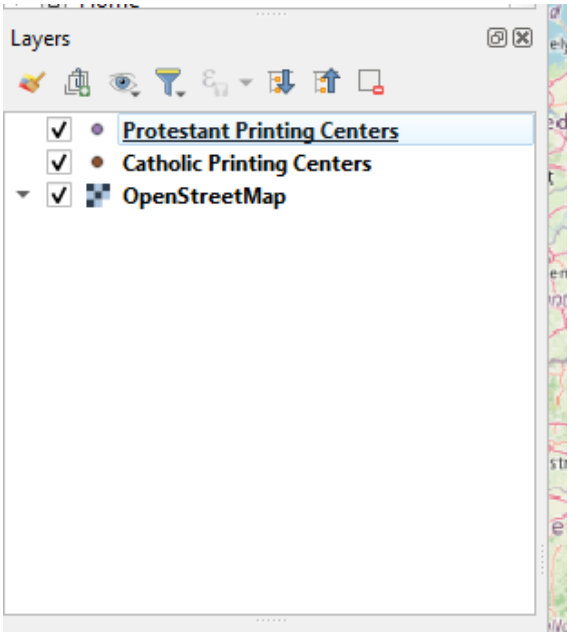
In preparation for class, you will need to download and install QGIS on your computer. You will also need to save the Exercise Materials folder provided by your instructor to an easy-to-find location on your computer.

Note: because QGIS is continuously updated, the layout of your screen may look slightly different from that in the screenshots below.

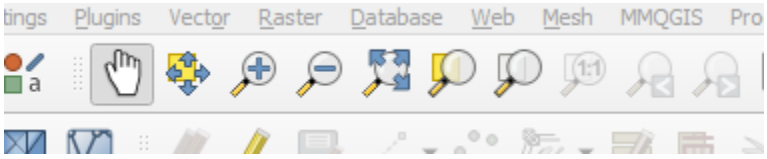
Getting Started

1. Launch QGIS on your computer.
2. Click the **Open Project** button. Navigate to the Exercise Materials folder (wherever you saved it on your computer–see above), and open the **Protestant and Catholic Printing Exercise** project file.

   In the interest of time, the basic data structures of this file have already been set up for you. You can see the different data "layers" that make up your GIS file in the **Layers pane**. At the moment there are 3: a **basemap** from OpenStreetMap and two empty **shapefiles** that you'll use to store the historical GIS data you create today. You can use the checkboxes in the Layers pane to turn individual layers on and off.



3. Familiarize yourself with the tools for navigating the **Map Pane** in the center of your screen, such as the **Pan** tool and the various **Zoom** tools. Navigate the map to focus on central Europe.

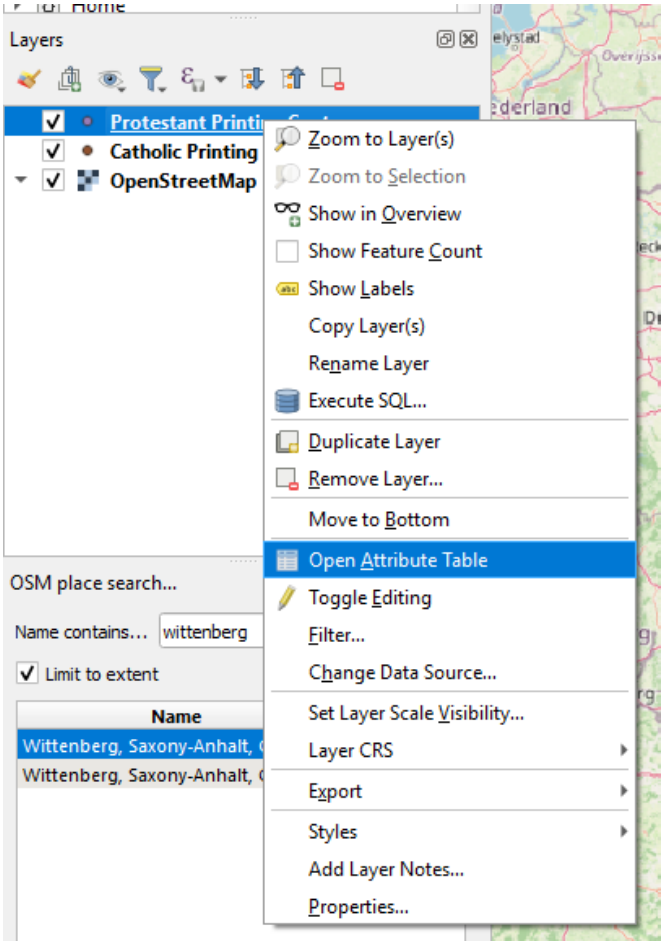


Creating Spatial Data

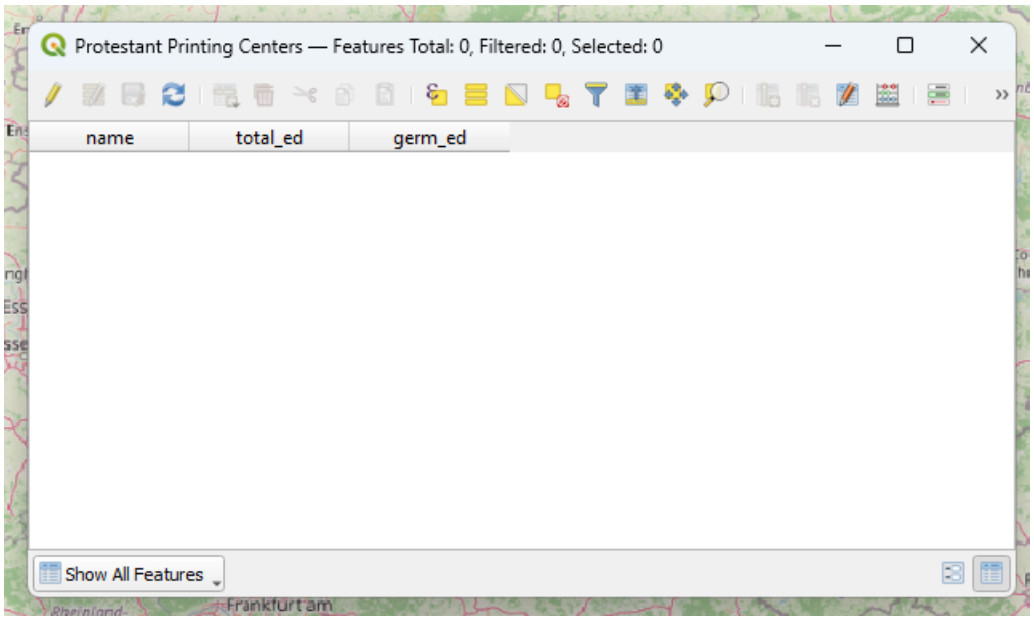
4. To begin, let's use the **Protestant Printing Centers** shapefile to map the data found in Tables 3 and 4 from the assigned reading.

   When you create spatial data you link **geometry data** (coordinates representing the location of a feature on the earth's surface) with **attribute data** (other relevant information about a place). In the case of the printing centers, we will use our attribute data to store the name of each city, the number of editions of Luther's works published there in both German and Latin (found on Table 3) and the number of editions published in German alone (found on Table 4).

   You can see all attribute data for a given shapefile by viewing its **Attribute Table.** In the Layers pane, right-click on the Protestant Printing Centers shapefile and select **Open Attribute Table**.

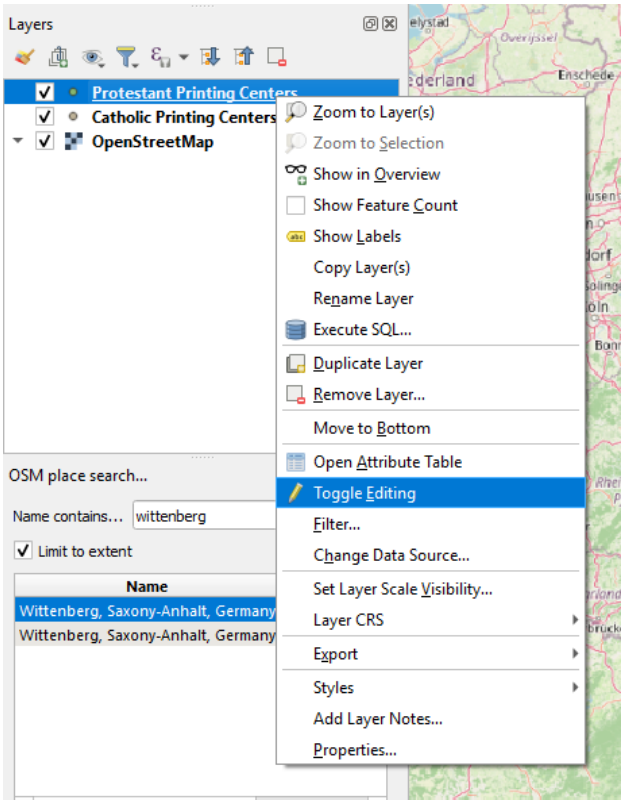


You will see a spreadsheet with headings for **name, total_ed** (number of editions in German and Latin) and **germ_ed** (number of editions in German). At the moment, the spreadsheet is empty–to fill it, we need to start plotting features on the map.



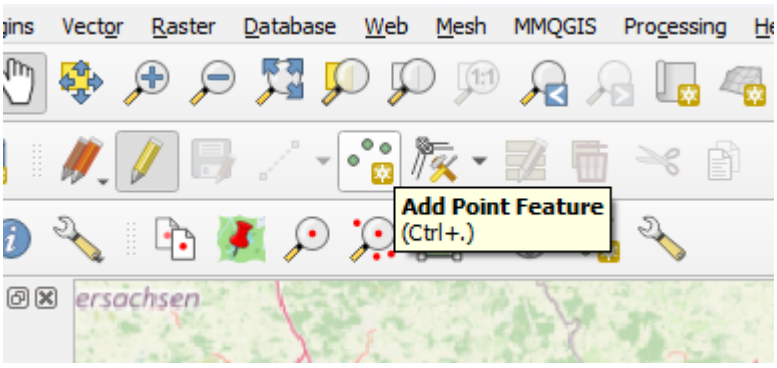
5. First, we need to enable editing for the Protestant Printing Centers shapefile. This "unlocks" the shapefile so that we can create new features in it.

   In the layers pane, right-click on the Protestant Printing Centers shapefile, and select **Toggle Editing**. A small pencil icon should appear next to the shapefile in the layers pane to let you know that editing is active.

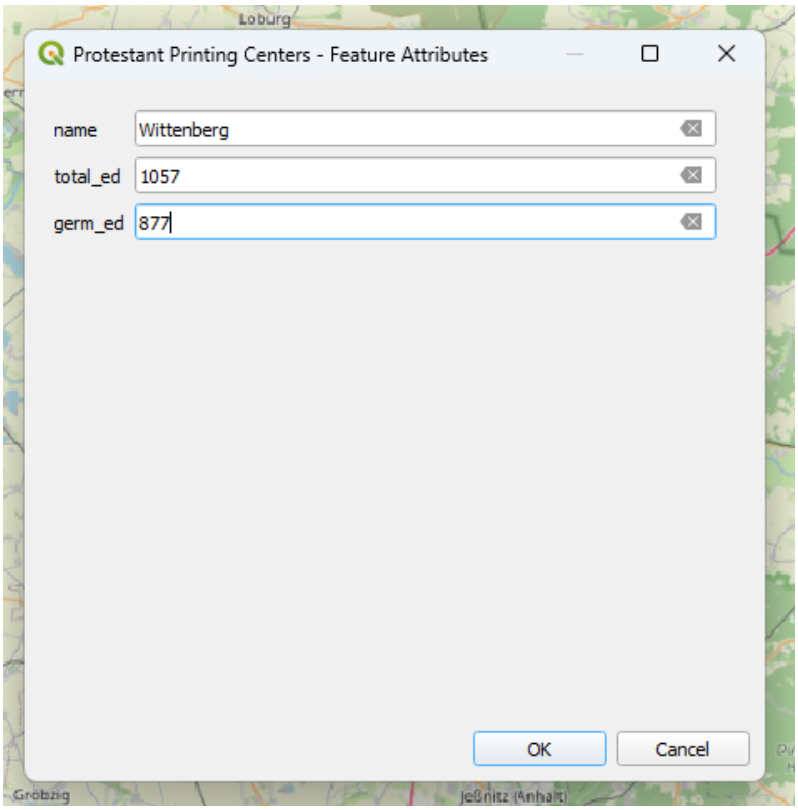


6. Consult Table 3 from the assigned reading. Locate the first city (Wittenberg) on the map (you may want to use the GHDI sample maps to help find it).

   Make sure that the Protestant Printing Centers shapefile is selected in your layers panel, then click the **Add Point Feature** button. Click on the location of Wittenberg on your map pane to create a point feature there.



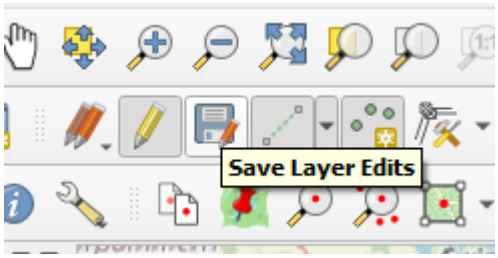
7. A pop-up window will ask you to enter attribute data for your new point. Enter its name, the total number of Latin and German editions of Luther's works (1057; see Table 3), and the total number of German editions of Luther's works (877; see Table 4). Click OK.



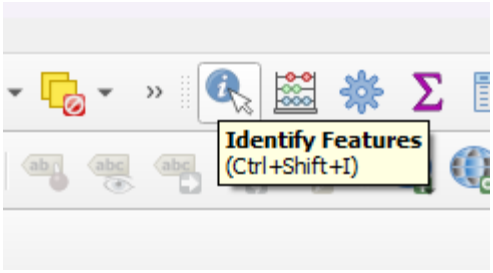
8. Repeat this process to enter the other Protestant Printing Centers listed in Tables 3 and 4 of the assigned reading.

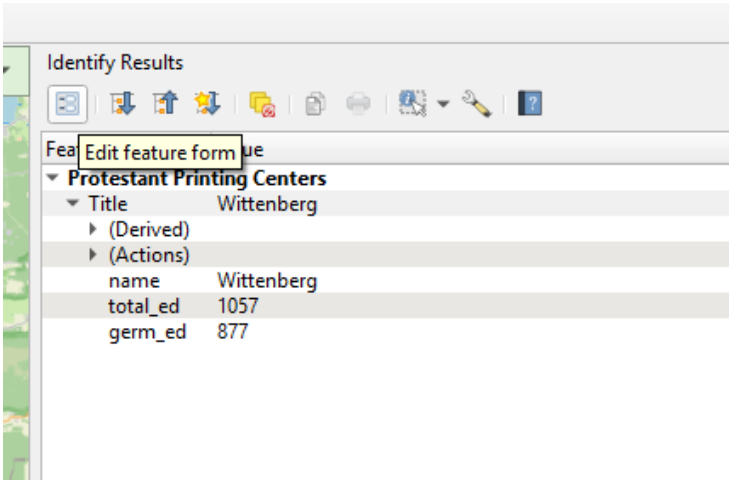
Helpful Tips:

a. You should save the edits to your shapefile frequently. To do this, click the **Save Layer Edits** button.



b. If you need to edit the attributes for a feature, you can either bring up the Attribute Table and change the relevant cells (see instructions for opening the attribute table in Step 4, above), or select the feature on the map pane using the **Identify Features** button, then clicking the **Edit Feature Form** button in the Identify Results pane.





9. Repeat the steps above using the Catholic Printing Centers shapefile to map the data Listed in Tables 7 and 8 from the assigned reading.

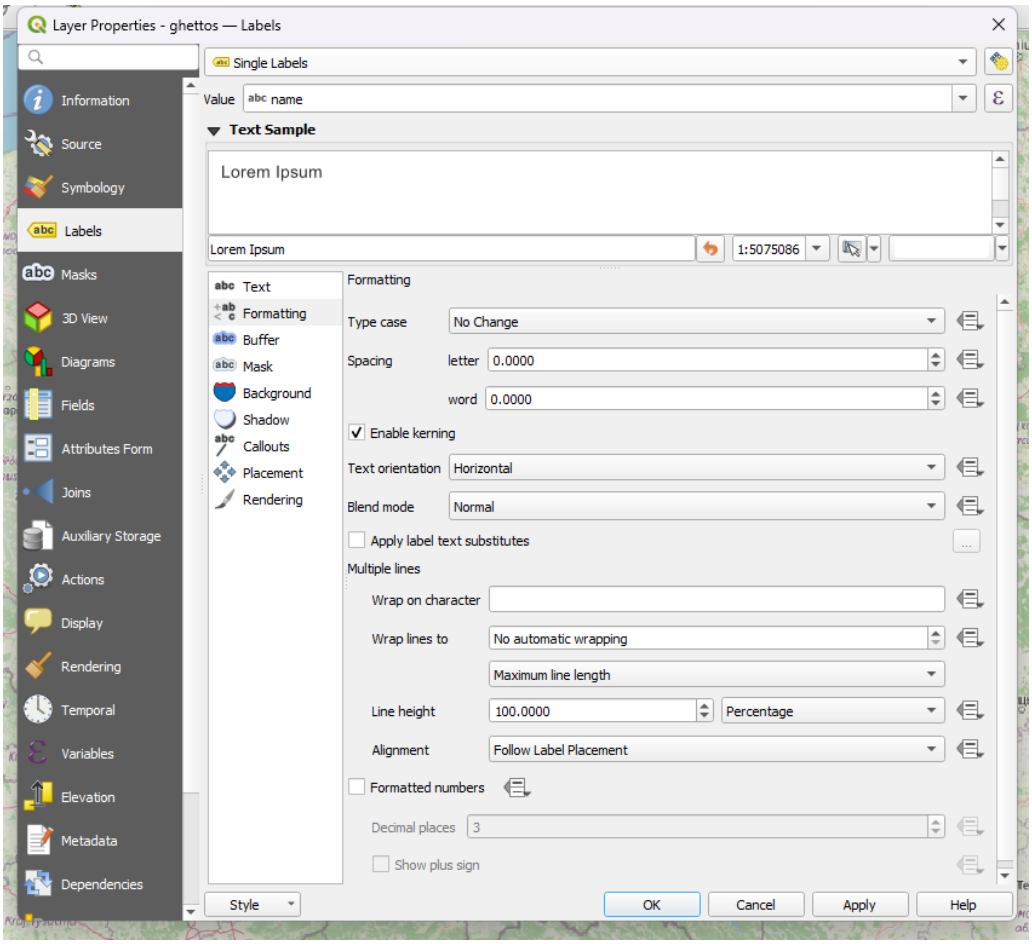
Symbolizing Spatial Data

10. Once you've mapped the locations of Protestant and Catholic printing centers, we can use QGIS' data visualization tools to depict the relative number of editions published in them..

    To begin, let's turn on labels for our sites to make the map easier to navigate. In the layers pane, double-click on your Protestant Printing Centers shapefile to pull up its **Layer Properties** window. Navigate to the **Labels** panel and set the drop-down menu to **Single Labels.** Make sure the **Value** (the column in the attribute table from which QGIS will pull the text for the label) is set to **name**. Click **Apply**.

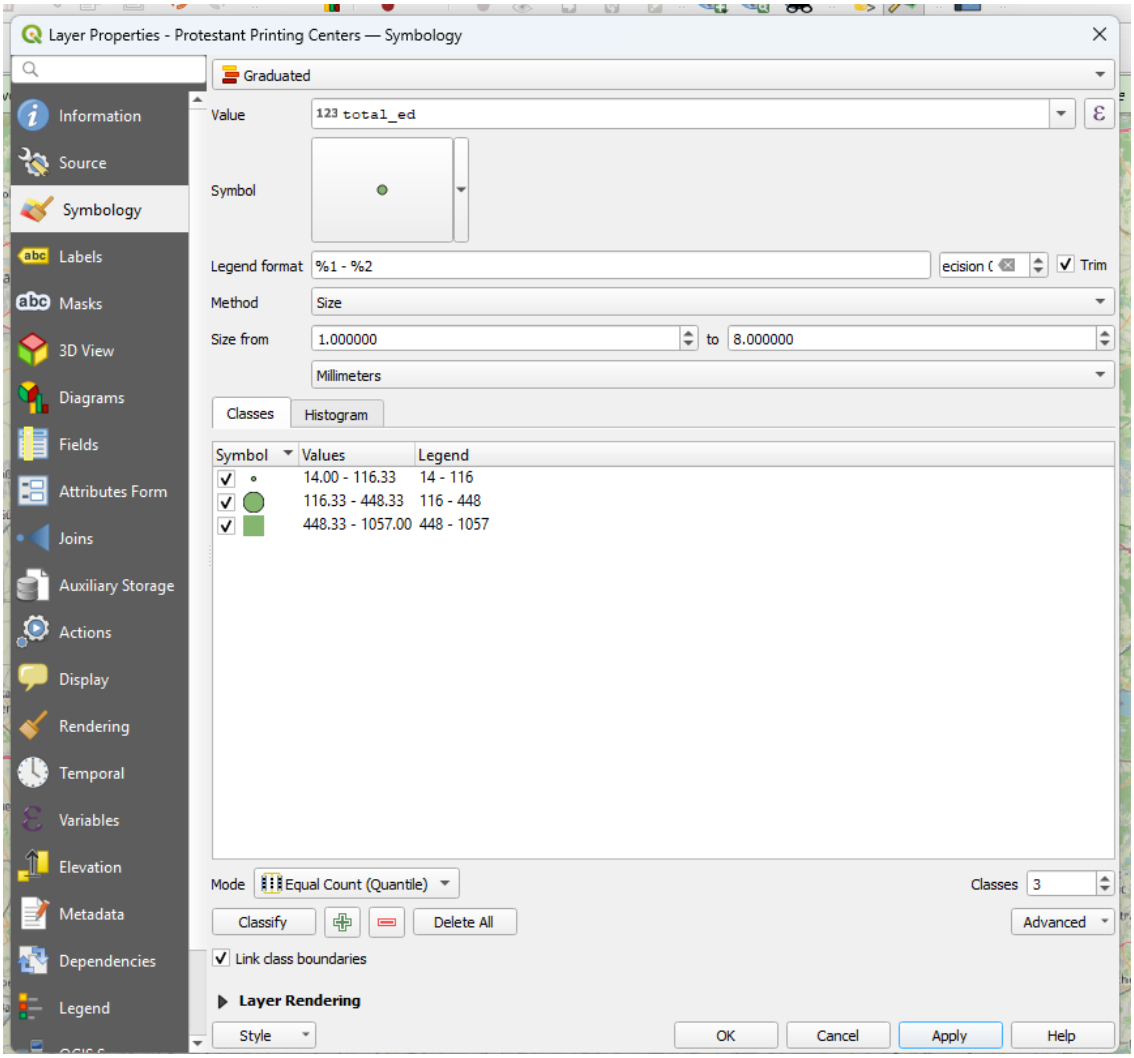
    Repeat these steps for the Catholic Printing Centers shapefile.

    Note: You can experiment with the other settings on the Layer Panel to change the appearance of your labels.



11. Next, let's adjust the symbology for the Protestant Printing Centers shapefile so that cities which published more editions of Luther's works have larger dots. In the Layer Properties window, go to the **Symbology** panel.
    a. Set the drop-down menu to **Graduated**
    b. Set the **Value** (the column of the attribute table from which QGIS will pull the data for determining symbol size) to **total_ed.**
    c. Set the **Method** to **Size**.
    d. Click **Classify**, which will automatically read all the data in your shapefile and divide it into symbology classes. Given the relatively small number of sites in your dataset, lower the number of **Classes** to 3.
    e. Click Apply, then close the Layer Properties window.

    Note: You can experiment with the other settings on this panel to adjust the appearance of your symbols.



12. Repeat this procedure with your Catholic Printing Centers shapefile.

    Your map should now show Protestant and Catholic Printing Centers, each one labeled by name, with a symbol size correlating to its publishing output.

13. While your map shows the publishing output of Protestant printing centers relative to other Protestant centers, and the output of Catholic centers relative to other Catholic centers, the two shapefiles are not correctly symbolized relative to *each other*. We can use the **Classes** tool in the Symbology panel to fix this issue.

    Open the Symbology panel for the Protestant Printing Centers shapefile, and note down the top and bottom **Values** used to define each symbol class. Then, open the Symbology panel for Catholic Printing Centers. Double-click on the **Values** for each

symbol class, and manually adjust them to match the values from the Protestant centers shapefile. Click Apply.

14. **Bonus Challenge:** Adjust the symbology of both shapefiles so that your symbol sizes reflect publishing output in German alone (rather than in Latin and German). Note that you will have to reset the symbol classes as you did in Step 13 above. How does this new view change your interpretation of the data?