Batch: HDA2 Roll No.: 16010123012

Experiment No. 4

Title: Implement vector data styling and raster data styling in QGIS

Course Outcome:

CO2 Apply the data analytics in the field of geospatial system

Books/ Journals/ Websites referred:

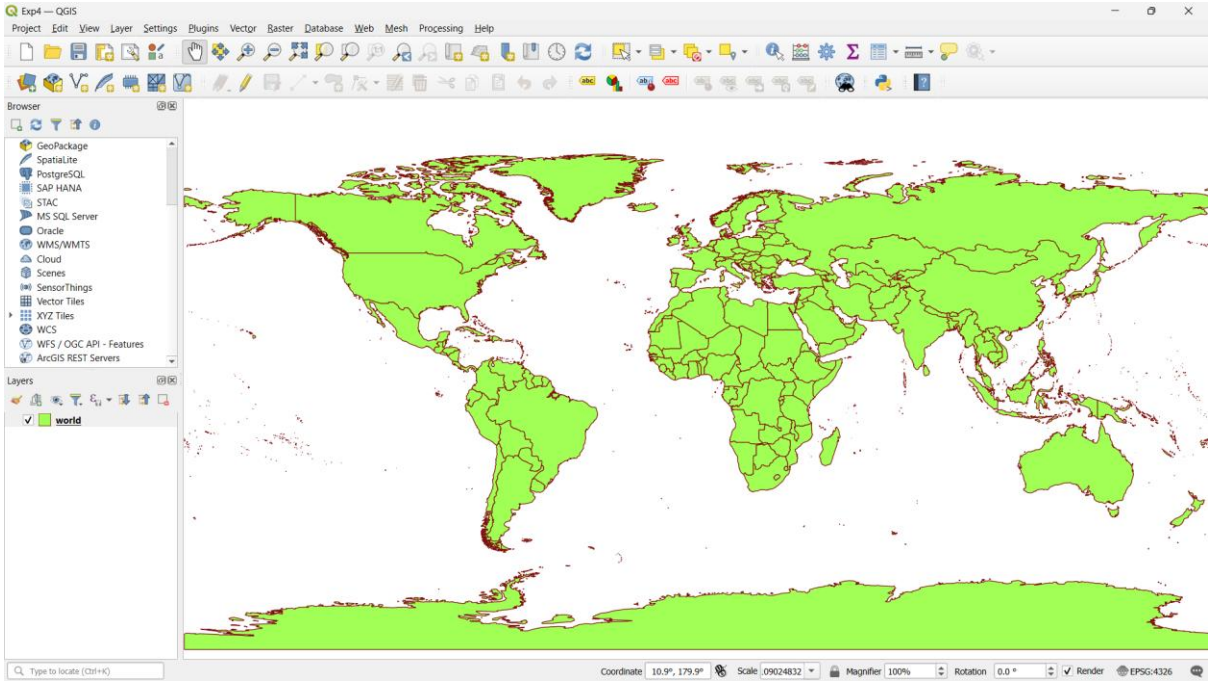
QGIS Installation Link:
https://www.qgis.org/download/ - Version 3.38

Resources used:
https://spoken-tutorial.org/watch/QGIS/Vector+Data+Styling/English/
https://spoken-tutorial.org/watch/QGIS/Raster+Data+Styling/English/
https://qgis.org/resources/hub/

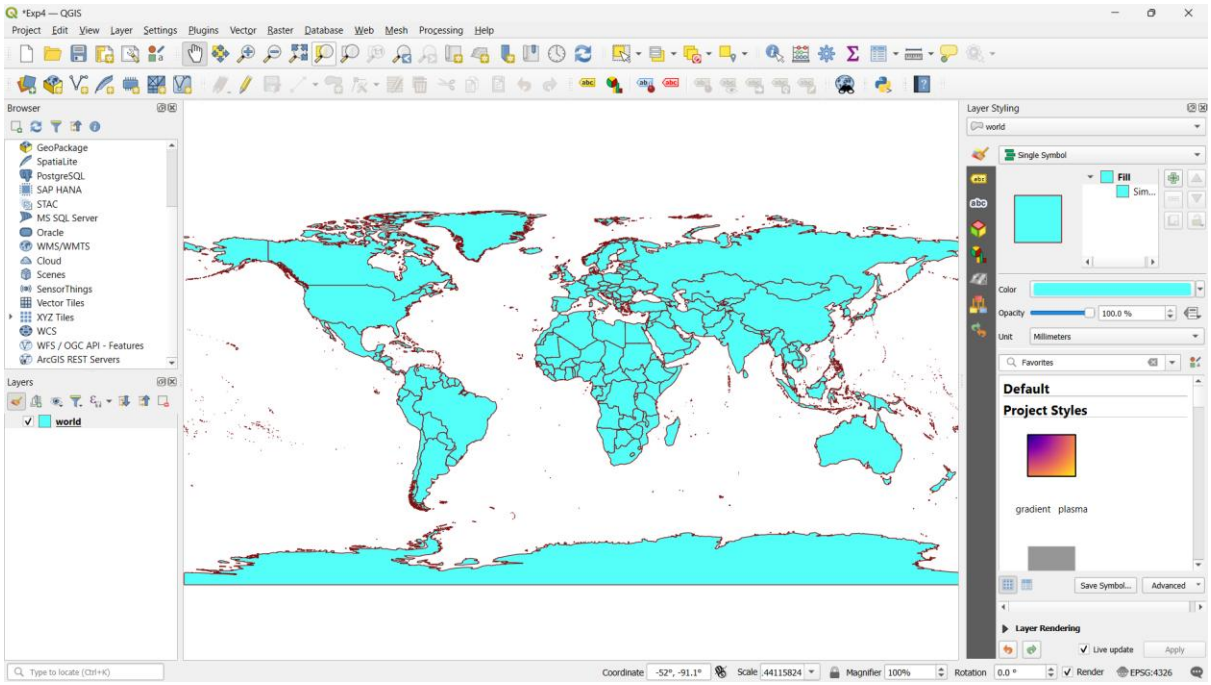
Algorithm: Vector data styling

Open QGIS and Load Vector Data:

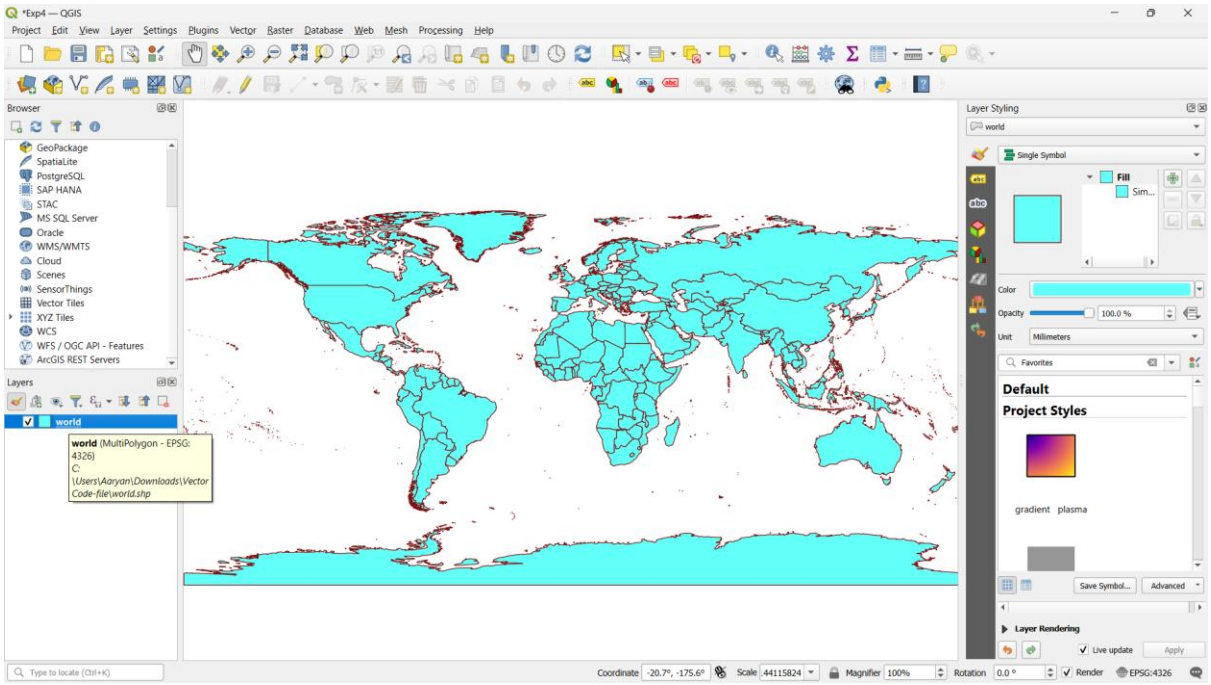
Step 1: Start QGIS and load your vector data (e.g., shapefile, GeoJSON, etc.). Go to Layer-> Add Layer -> Add Vector Layer -> Upload the code file



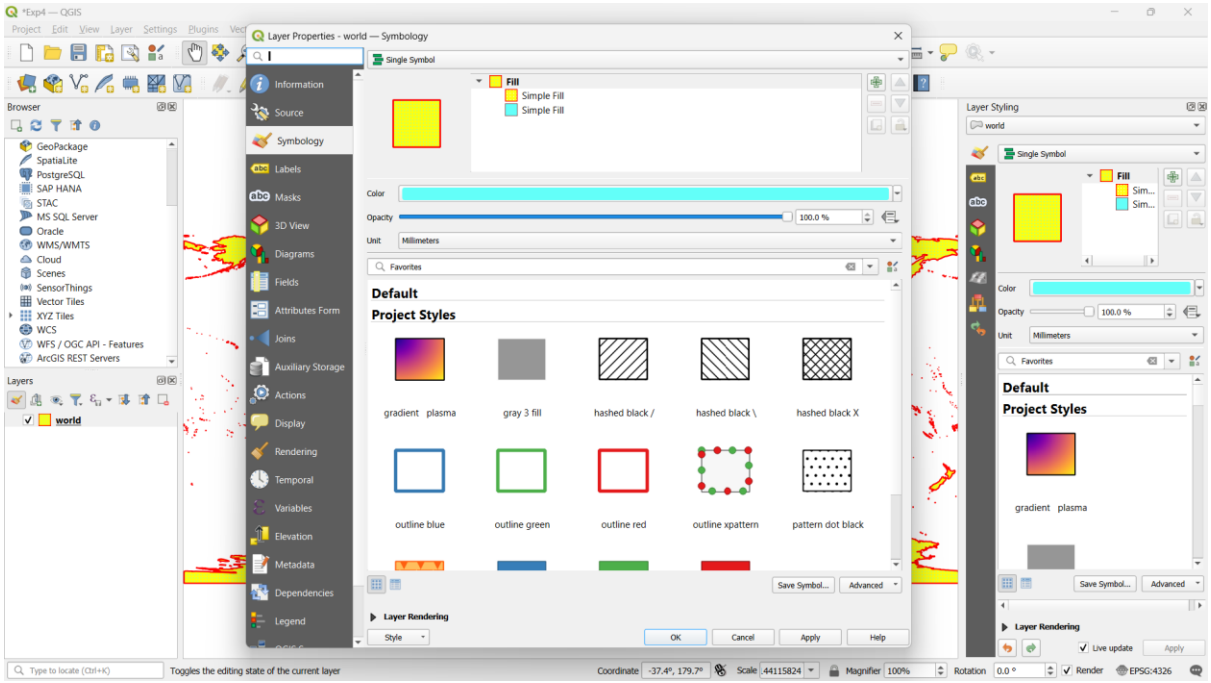
Step 2: Open the Layer Styling Panel



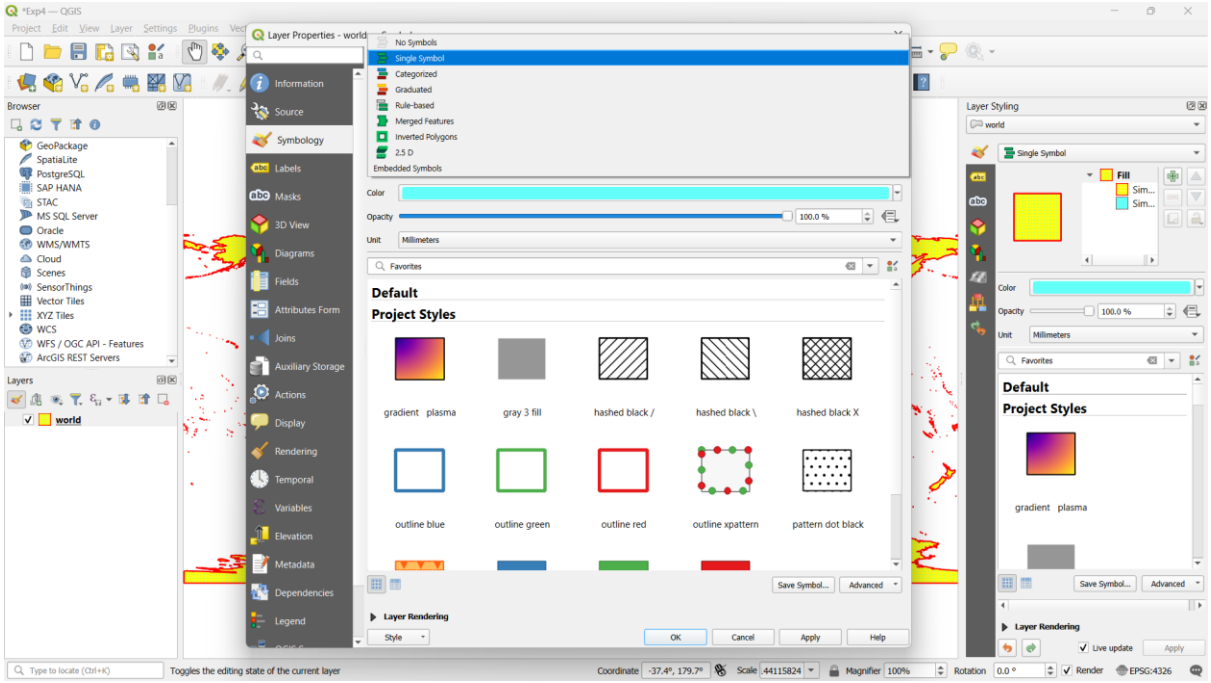
Step 3: Select your vector layer in the Layers panel.



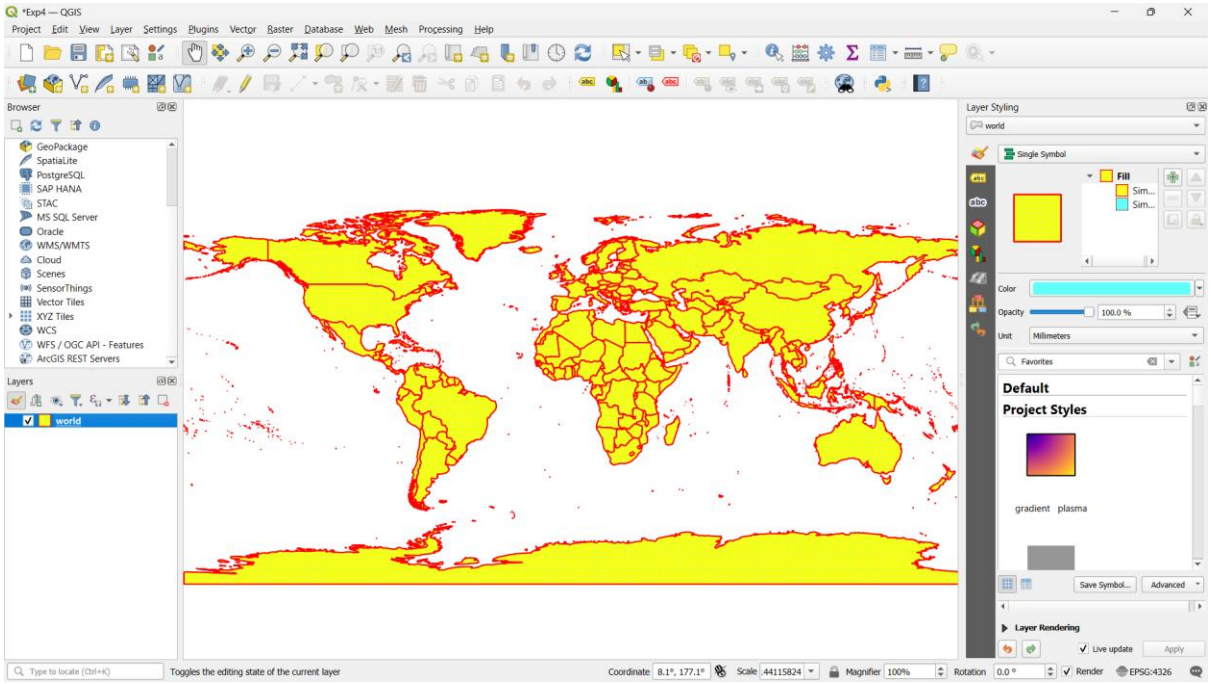
Step 4: Right-click the layer and choose "Properties" or click on the "Layer Styling" panel on the right.



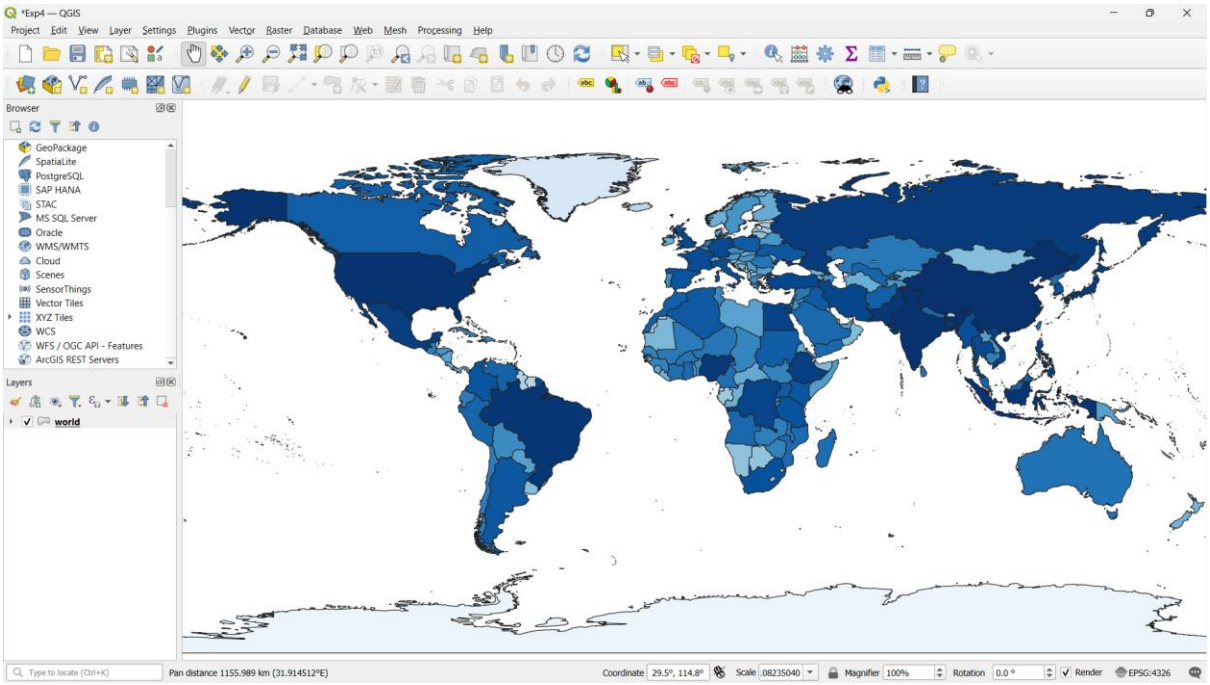
Step 5: Select a Symbology Type: In the Layer Properties window, go to the "Symbology" tab. Choose a symbology type (e.g., Single Symbol, Categorized, Graduated).



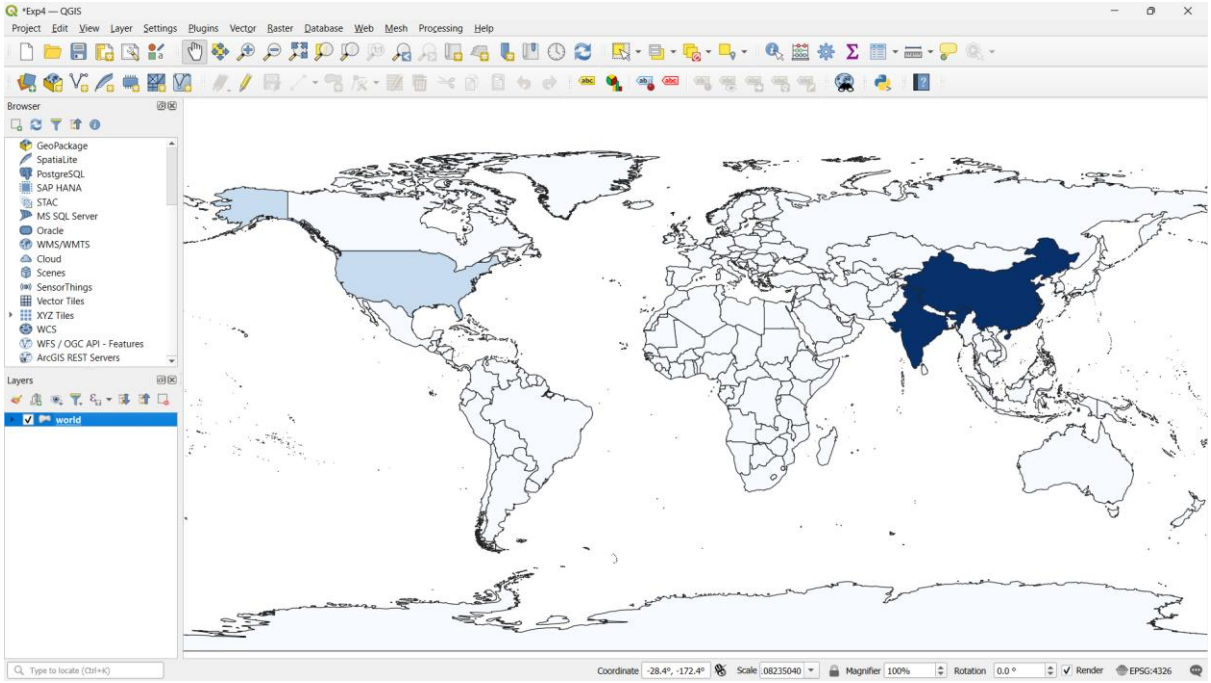
Step 6: Single Symbol Styling: For simple styling, choose "Single Symbol." Select the symbol and click on the symbol to open the Symbol Selector. Customize the symbol's color, outline, transparency, and other properties.



Step 6: Categorized Styling: Choose "Categorized" to style the layer based on a categorical attribute. Select the attribute column and click "Classify" to generate unique symbols for each category. Customize each category's symbol by clicking on the symbol next to each category.

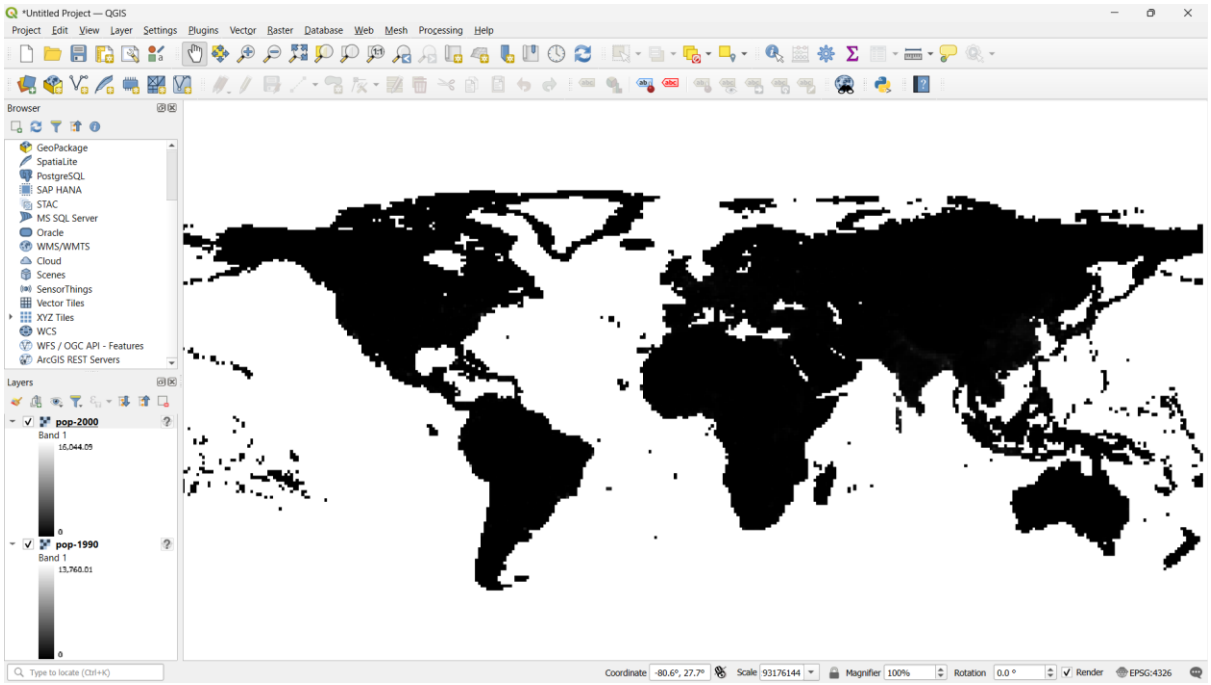


Step 7: Graduated Styling: Choose "Graduated" to style the layer based on a numeric attribute. Select the attribute column and the classification mode (e.g., Equal Interval, Quantile). Click "Classify" to generate ranges and corresponding symbols. Customize each range's symbol by clicking on the symbol next to each range.

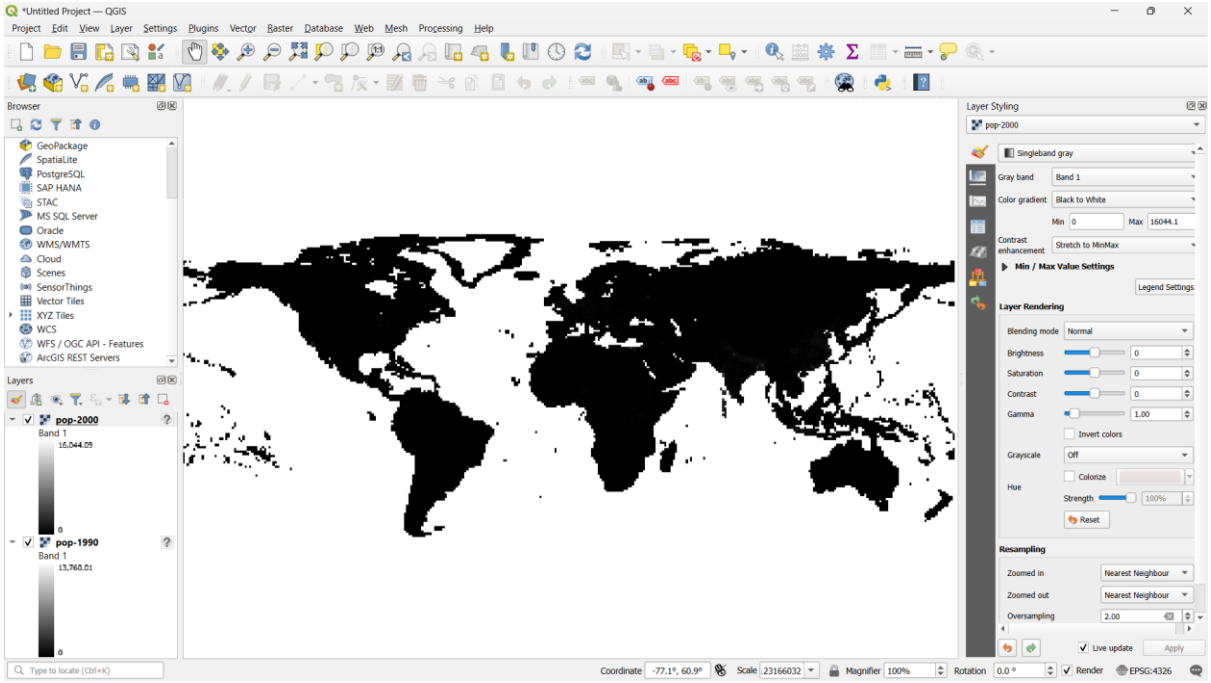


Algorithm: Raster data styling

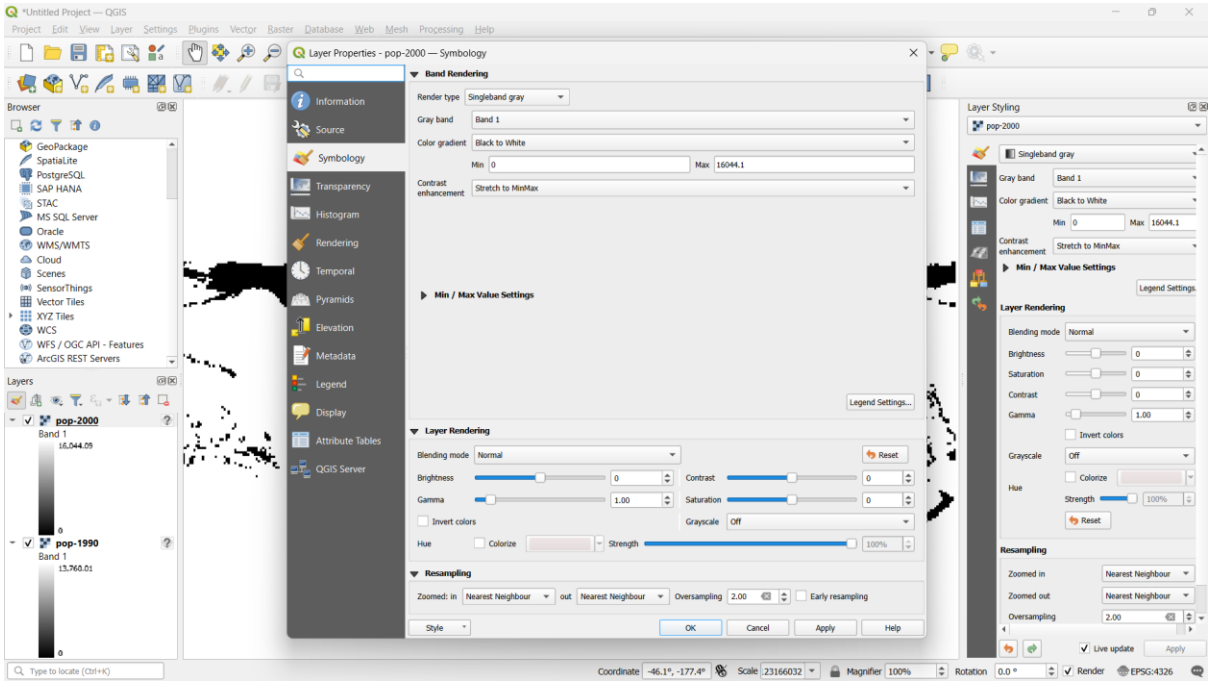
Step 1 : Start QGIS and load your raster data (e.g., GeoTIFF, JPEG, etc.).



Step 2 : Open the Layer Styling Panel:

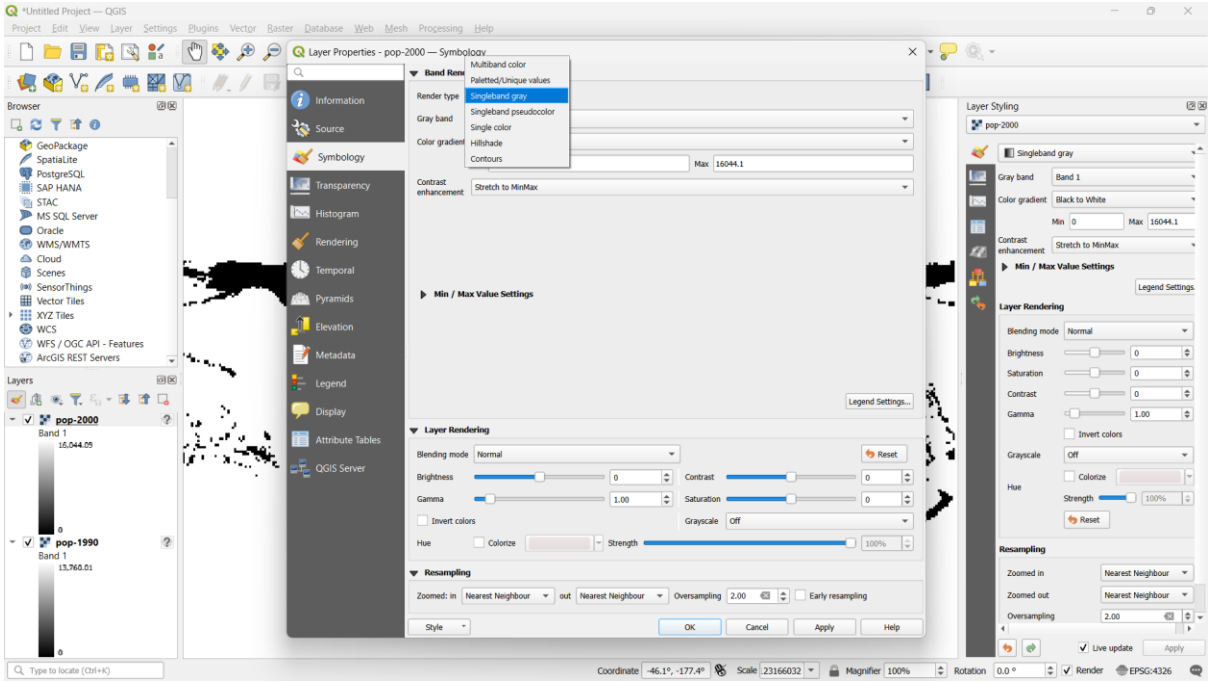


Step 3 : Select your raster layer in the Layers panel. Right-click the layer and choose "Properties" or click on the "Layer Styling" panel on the right.

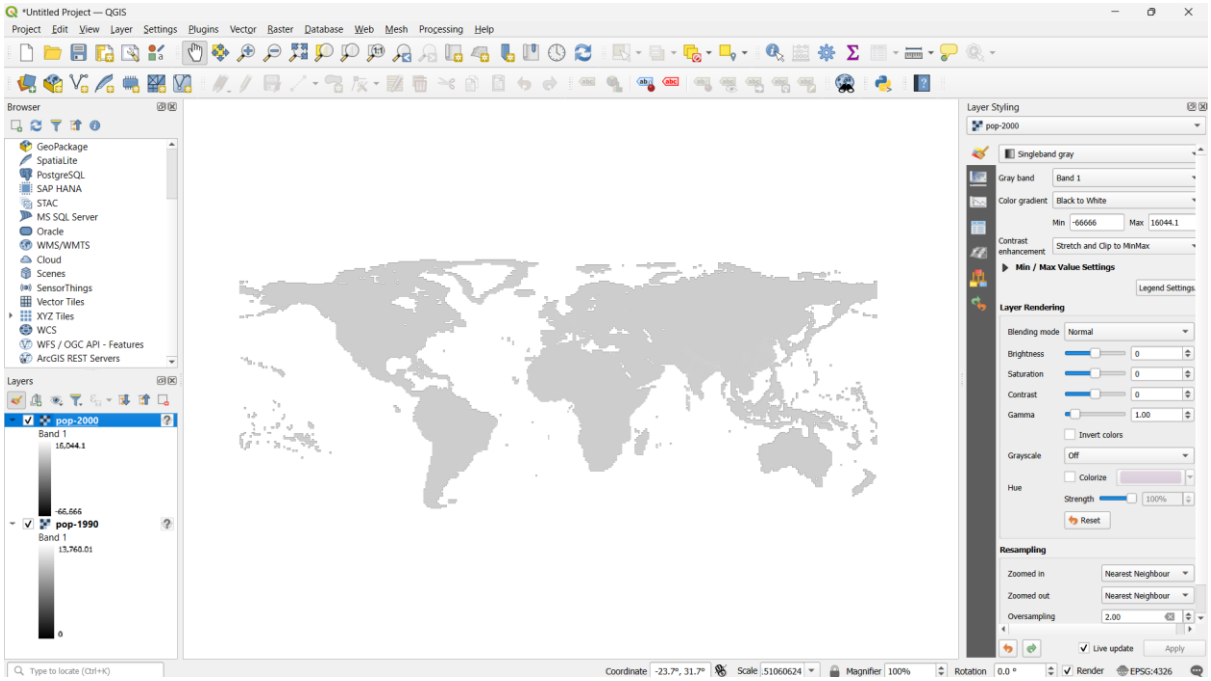


Step 4 : Select a Render Type: In the Layer Properties window, go to the "Symbology" tab.

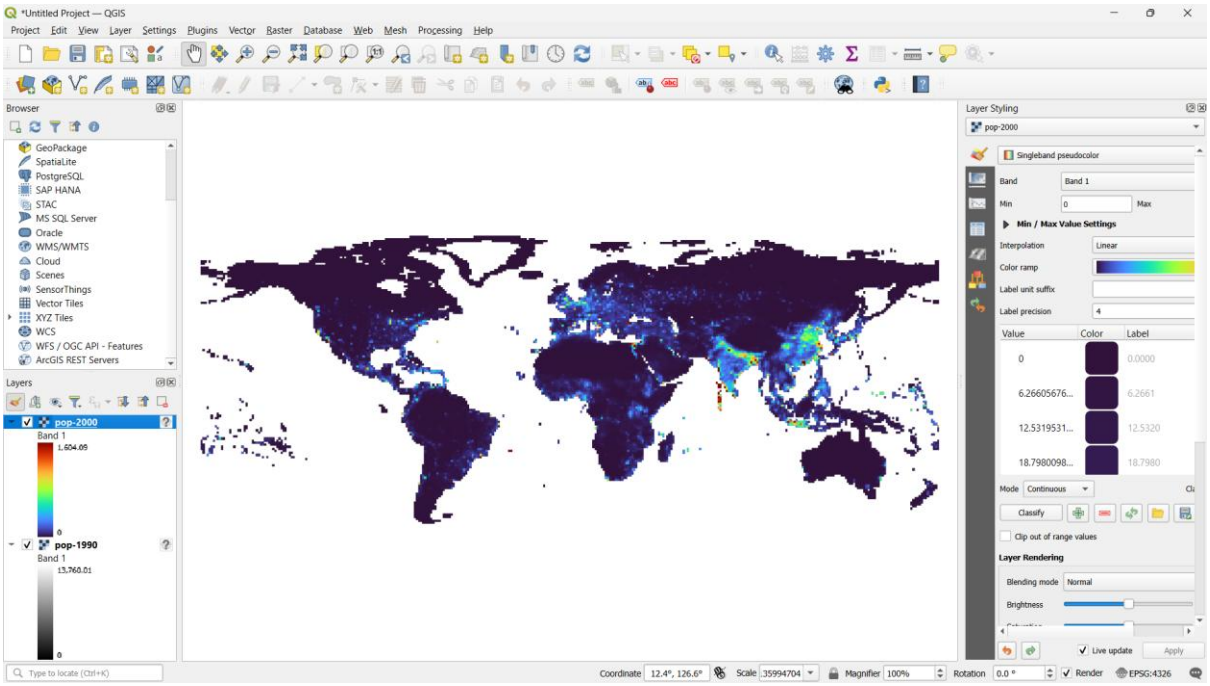
Step 5: Choose a render type (e.g., Singleband gray, Singleband pseudocolor).



Step 6 : Singleband Gray: For grayscale images, choose "Singleband gray." Adjust the Min and Max values or use the "Load Min/Max Values" button. Choose a Contrast Enhancement mode (e.g., Stretch to MinMax, Stretch and Clip to MinMax).



Step 7 : Single band Pseudocolor: For continuous data, choose "Single band pseudocolor." Select a color ramp and adjust the Min and Max values. Click "Classify" to generate a color map based on the selected color ramp.



Task: Install QGIS Software version 3.38. Select different features and perform the vector data and raster data styling. Insert the output images for the respective task.

Platform used by the student:

Following points should be written by students

Different steps in Vector data styling and raster data styling Students need to write comments wherever needed

Conclusion:

I have successfully completed this experiment on vector and raster data styling using QGIS. Through this experiment, I learned how to apply different symbolization methods such as simple, categorized, and graduated symbols for vector data, and how to use grayscale, pseudocolor, and RGB rendering for raster data. This helped me understand how effective styling enhances map readability, highlights important patterns, and improves the visual interpretation of spatial data for better analysis and decision-making.

Post lab questions:

Q.1 How do different symbolization methods (e.g., simple symbols, graduated symbols, categorized symbols) impact the interpretation of vector data?

Different symbolization methods change how vector data is visually represented, affecting interpretation:

1. Simple Symbols: Assign the same style to all features; useful for showing uniform data without emphasis on categories.
2. Graduated Symbols: Vary symbol size or color intensity based on numeric values; helpful for showing magnitude differences (e.g., population density).
3. Categorized Symbols: Use different colors or styles for distinct attribute values; ideal for highlighting qualitative differences (e.g., land use types).

Choosing the right method ensures clearer communication of patterns, trends, and relationships in the data.

Q.2 How can attribute data be used to style vector layers effectively (e.g., using different colors for different categories or sizes based on numerical values)?

Attribute data can guide how vector layers are styled to make maps more informative:

1. Categorical Attributes: Use different colors, patterns, or shapes to represent categories (e.g., forest, water, urban).
2. Numerical Attributes: Use graduated colors or varying symbol sizes to represent value ranges (e.g., income levels, rainfall amounts).
3. Conditional Styling: Apply styles only to features meeting specific conditions (e.g., highlighting areas with population > 1 million).

This approach makes spatial patterns easier to recognize and interpret.

Q.3 Discuss in detail vector data styling and raster data styling.

Vector data consists of points, lines, and polygons, and styling focuses on visual representation through:

1. Simple Styling: Same symbol for all features.
2. Categorized Styling: Different colors/symbols for distinct attribute values.
3. Graduated Styling: Varying size or color intensity based on numerical attributes.
4. Rule-based Styling: Applying styles using logical conditions.
5. Custom Symbols: Using icons or patterns to represent specific features.

Raster data is a grid of cells (pixels) with values representing attributes like elevation or temperature. Styling involves:

1. Single-band Grayscale: Shades of gray representing value ranges.
2. Single-band Pseudocolor: Color gradients applied to value ranges for better differentiation.
3. Multi-band RGB: Combining three bands (Red, Green, Blue) to create true or false color composites (e.g., satellite imagery).
4. Hillshade & Relief: Adding shading to elevation data for 3D-like effects.

Raster styling helps reveal patterns in continuous data and enhances interpretation.