Your Name =Ankila Kumari *GIS 5555 Basic Spatial Analysis*

Time_Spent = 3 hr

[Windows+Shift+S for screenshot of your analysis, then paste into this doc]

[Fill the above-listed info and then submit the completed document in Canvas (try to include all analysis results that can help reflect your workflow and thoughts, i.e., images, information about data, your statements, etc.)]

Assignment for Lab 1b

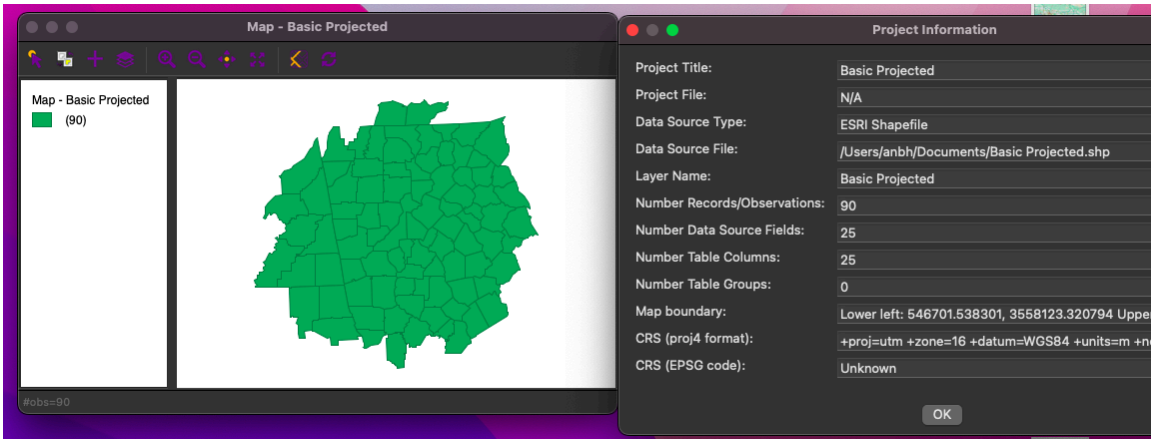
"Data Operations"

Briefly describe your data:

I downloaded data from the **GeoDa Data Lab(Atlanta)**, which was not projected. To ensure accurate spatial analysis, I obtained the coordinates using the **World UTM grid** and applied an appropriate projection in the spatial reference system.

- ***Task 1: Projection and themeless mapping***
  - *Read your data and check the CRS; If it is not projected, apply an appropriate projection to it. If it has, do a reprojection to epsg:4326. Then switch back to the projection you want to keep working on.*

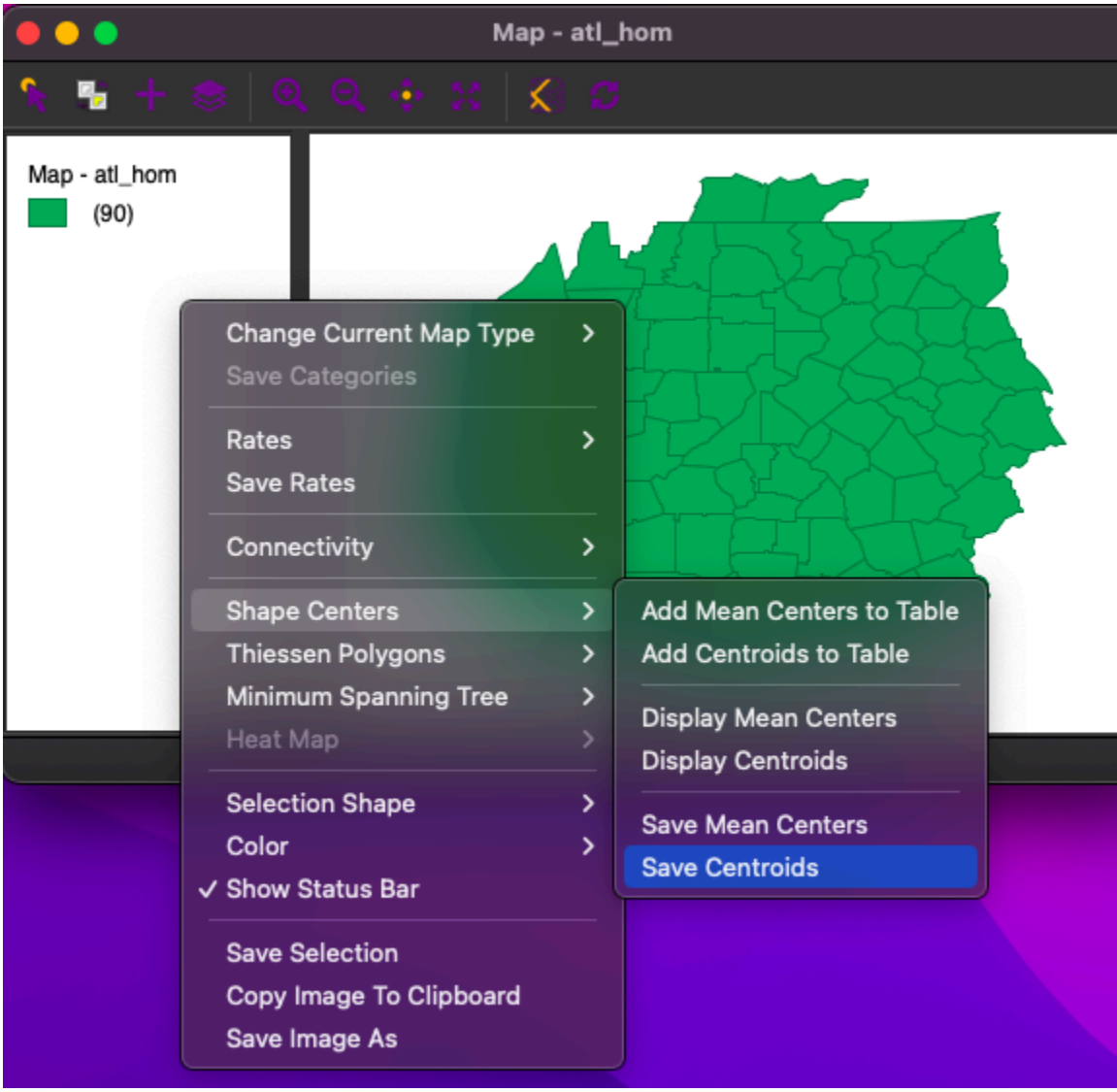
    *[Your analysis in steps. **Use this template for all other tasks**]*

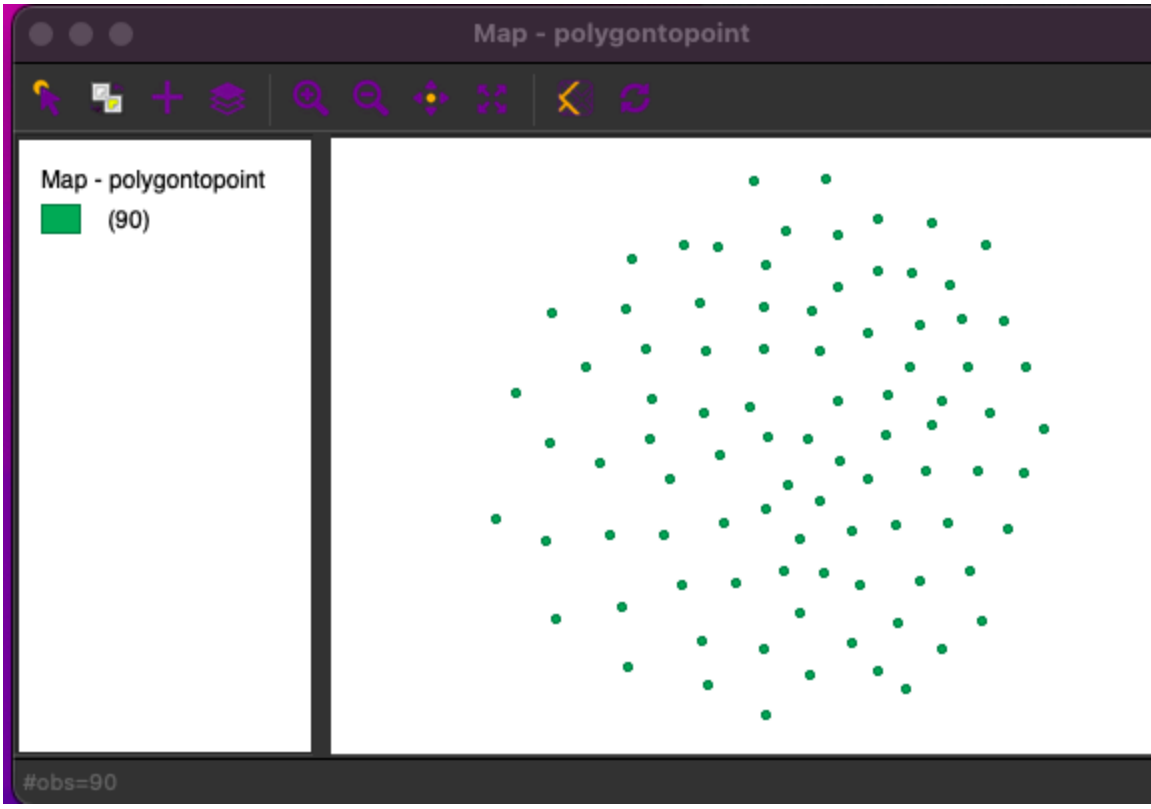
    1. *Checked CRS of the dataset (initially unprojected) and then Applied an appropriate projection using the World UTM grid and last Reprojected to EPSG:4326 (WGS 84) to ensure compatibility.*
    2. 

➢ ***Task 2: Spatial Data Type Conversion***

- *From Point to Polygon (Thiessen) or Polygon to Point*

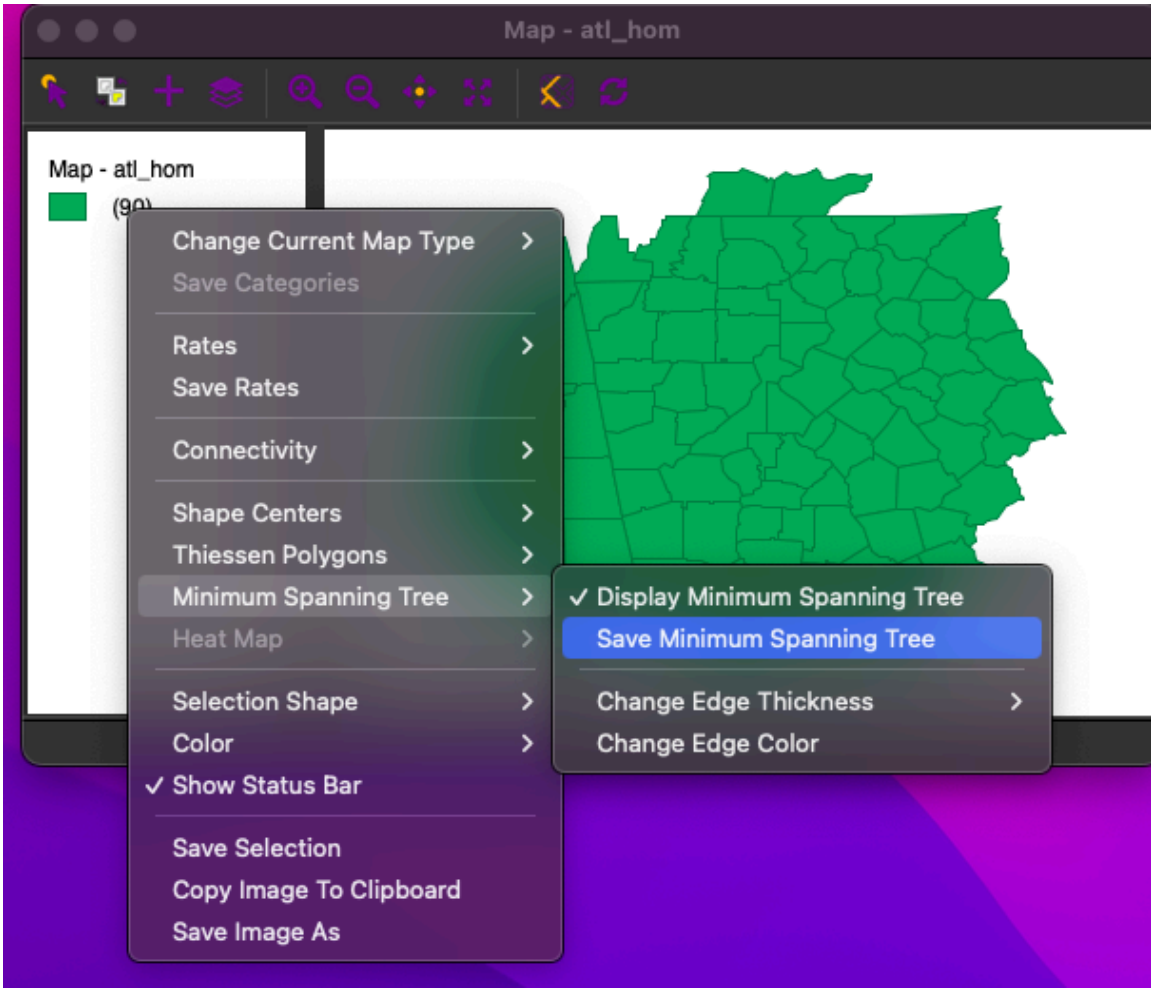
1. *From polygon to point*

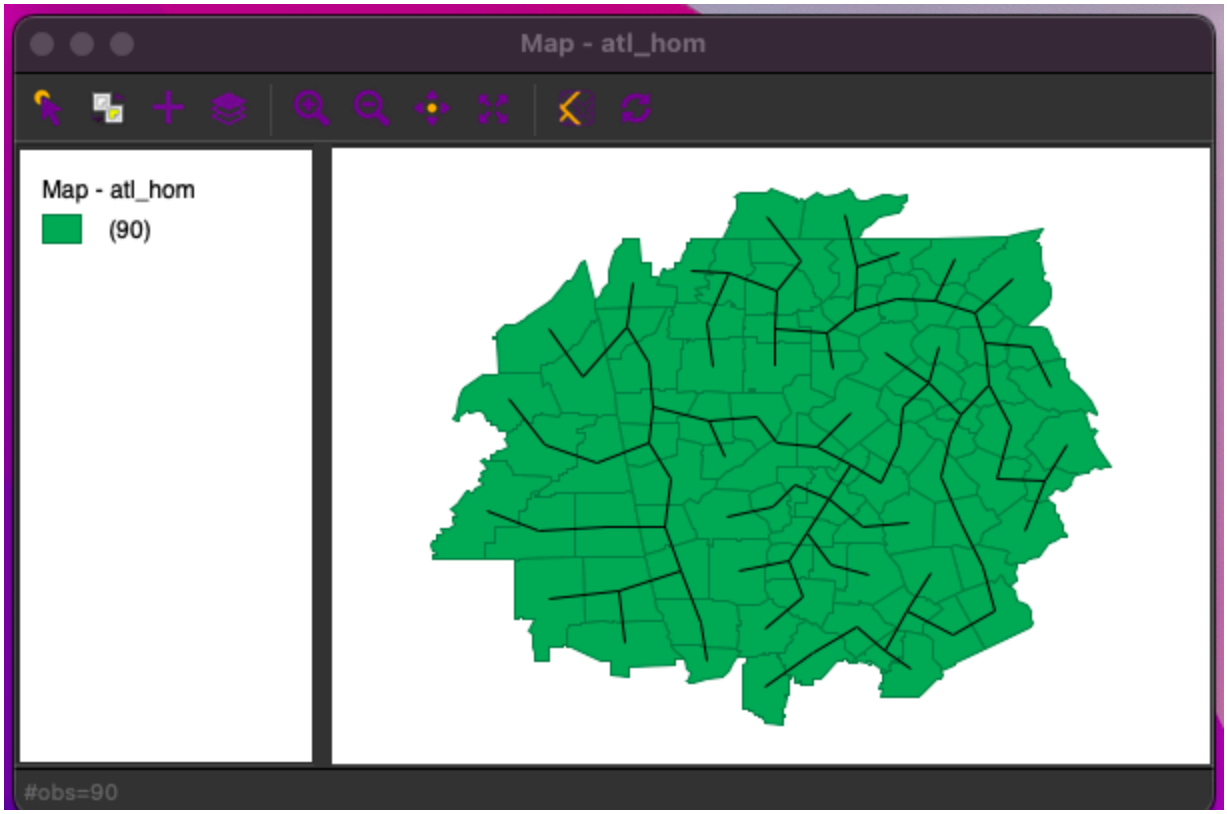




Converted Polygon to Point to extract centroids from polygon features.Generated a Minimum Spanning Tree (MST) from the centroid points to analyze spatial connectivity.

- *Create a MST layer from points (centroids)*

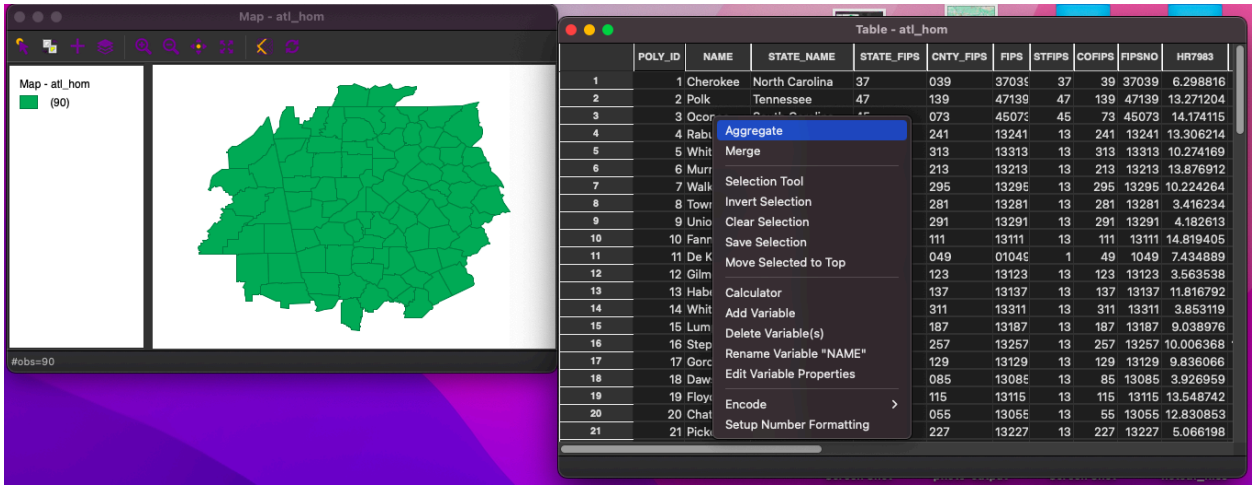

Map - atl_hom
Map - atl_hom
(90)
Change Current Map Type
Save Categories
Rates
Save Rates
Connectivity
Shape Centers
Thiessen Polygons
Minimum Spanning Tree
Heat Map
Selection Shape
Color
Show Status Bar
Save Selection
Copy Image To Clipboard
Save Image As
Display Minimum Spanning Tree
Save Minimum Spanning Tree
Change Edge Thickness
Change Edge Color

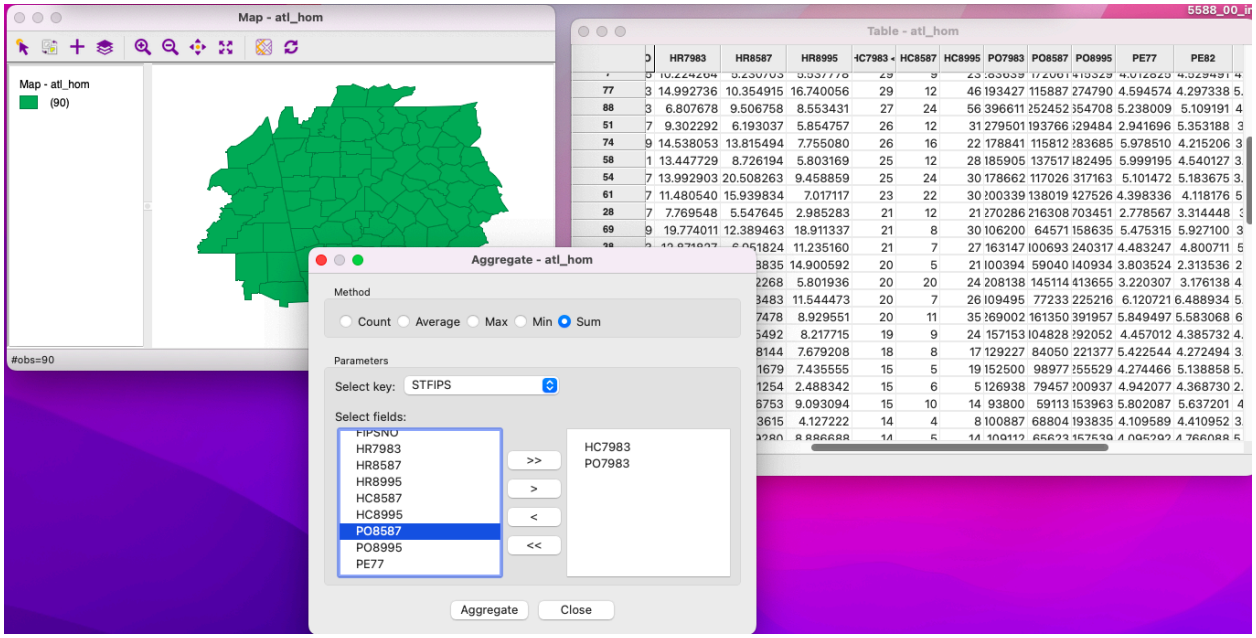


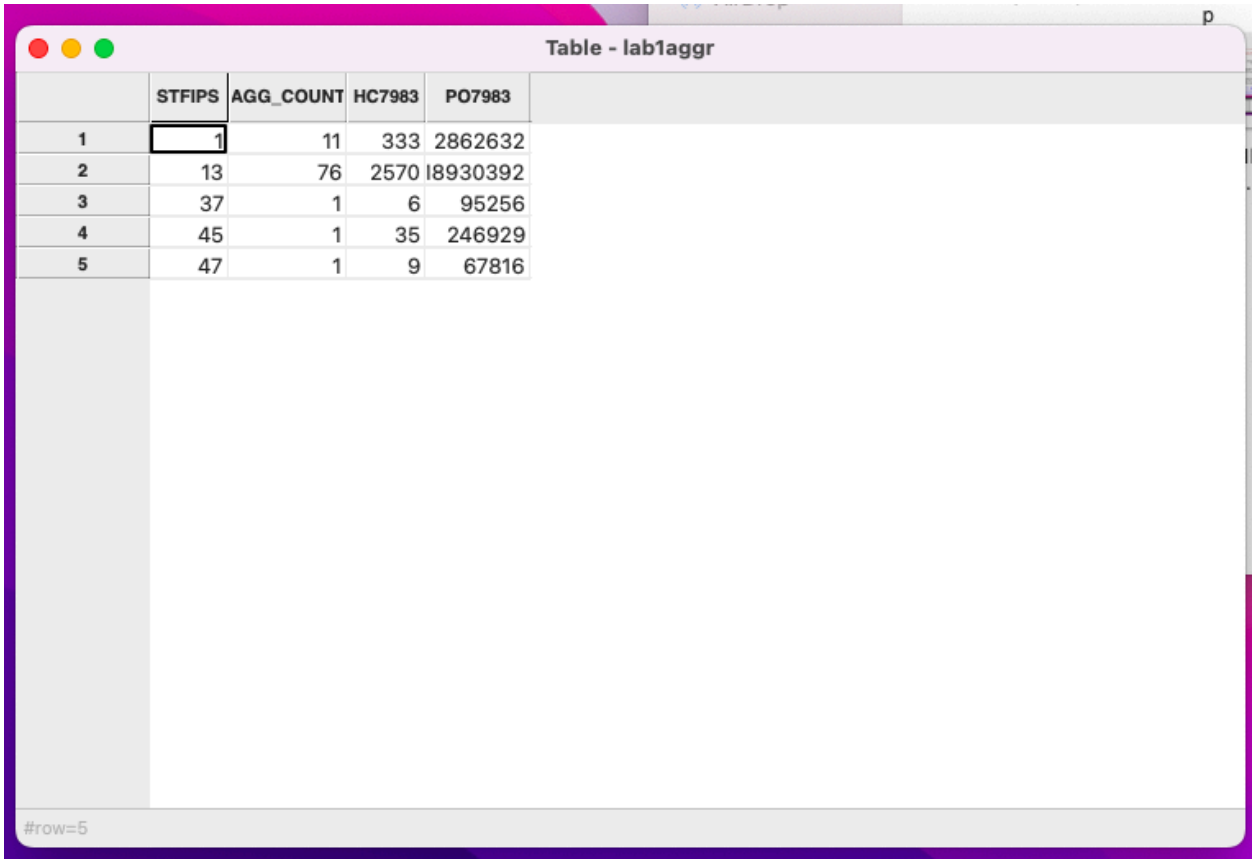
Generated a Minimum Spanning Tree (MST) from the polygon to analyze spatial connectivity.

➢ ***Taks 3: Aggregation and Spatial Join***

- *Aggregate a certain variable in your data table from finer scale to courser scale. If there is no coarser scale identified explicitly in the data table, try to do a spatial join based on another downloaded geography boundary layer (within the same study extent) and spatial join your data to the new geometries.*



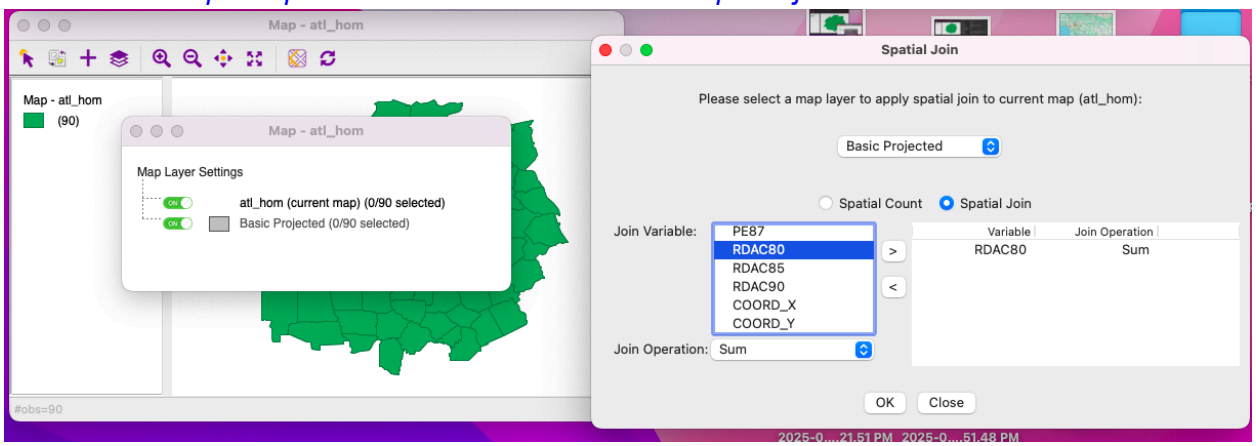




- *Use the Natregimes dataset as example and conduct the following:*

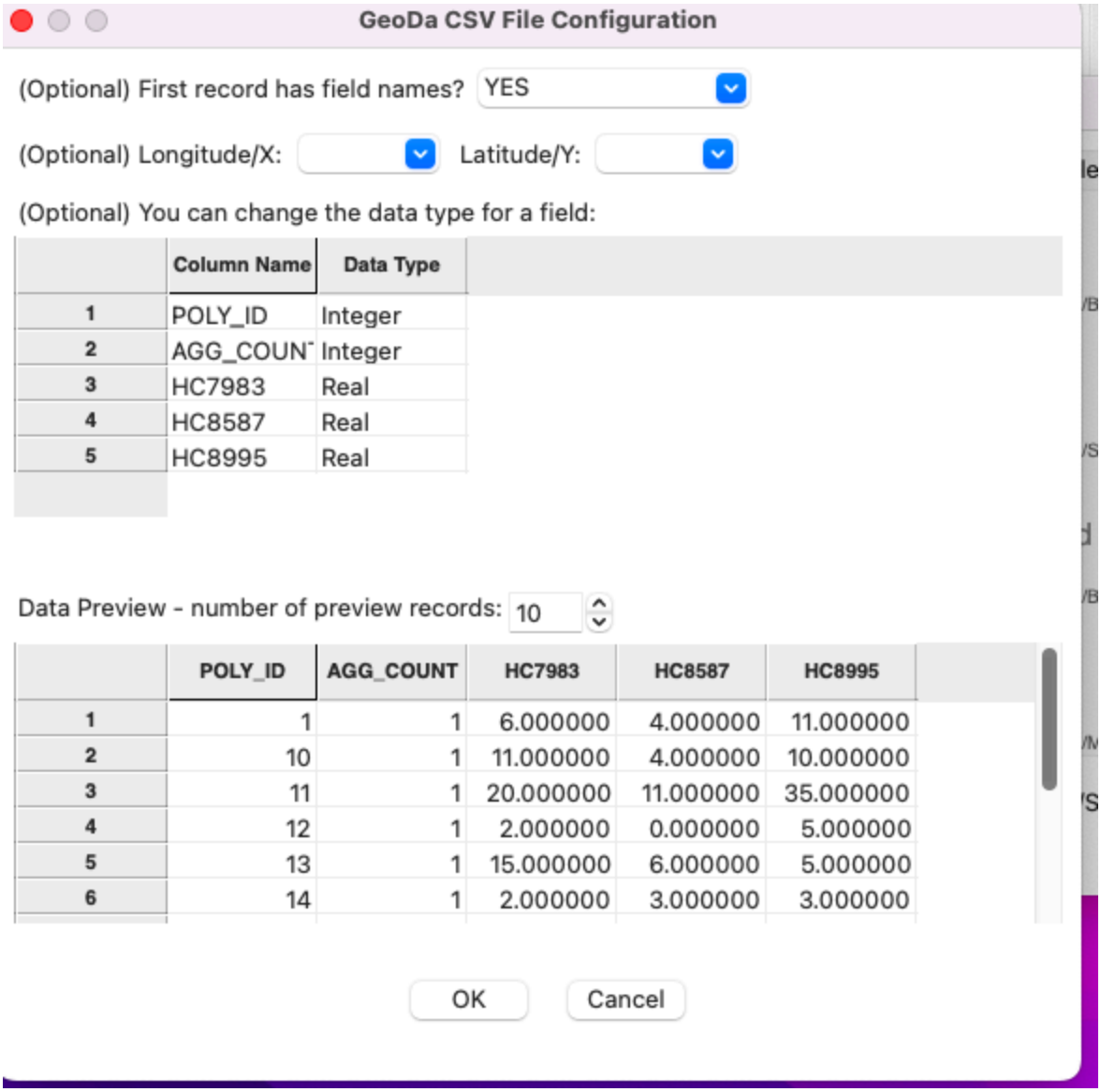
- *Select one spatially intensive variable and one spatially extensive variable.*
- *Explain the result based on Mean/SUM aggregation and why you cannot perform certain types of aggregation to certain variables.*

To Aggregate a variable from a finer to a coarser scale choose STFIPS, then select a Method Sum and then choose HC7983 and PO7983 and save the result as a table in dbf format to summarize spatial patterns. And then Performed a spatial join.

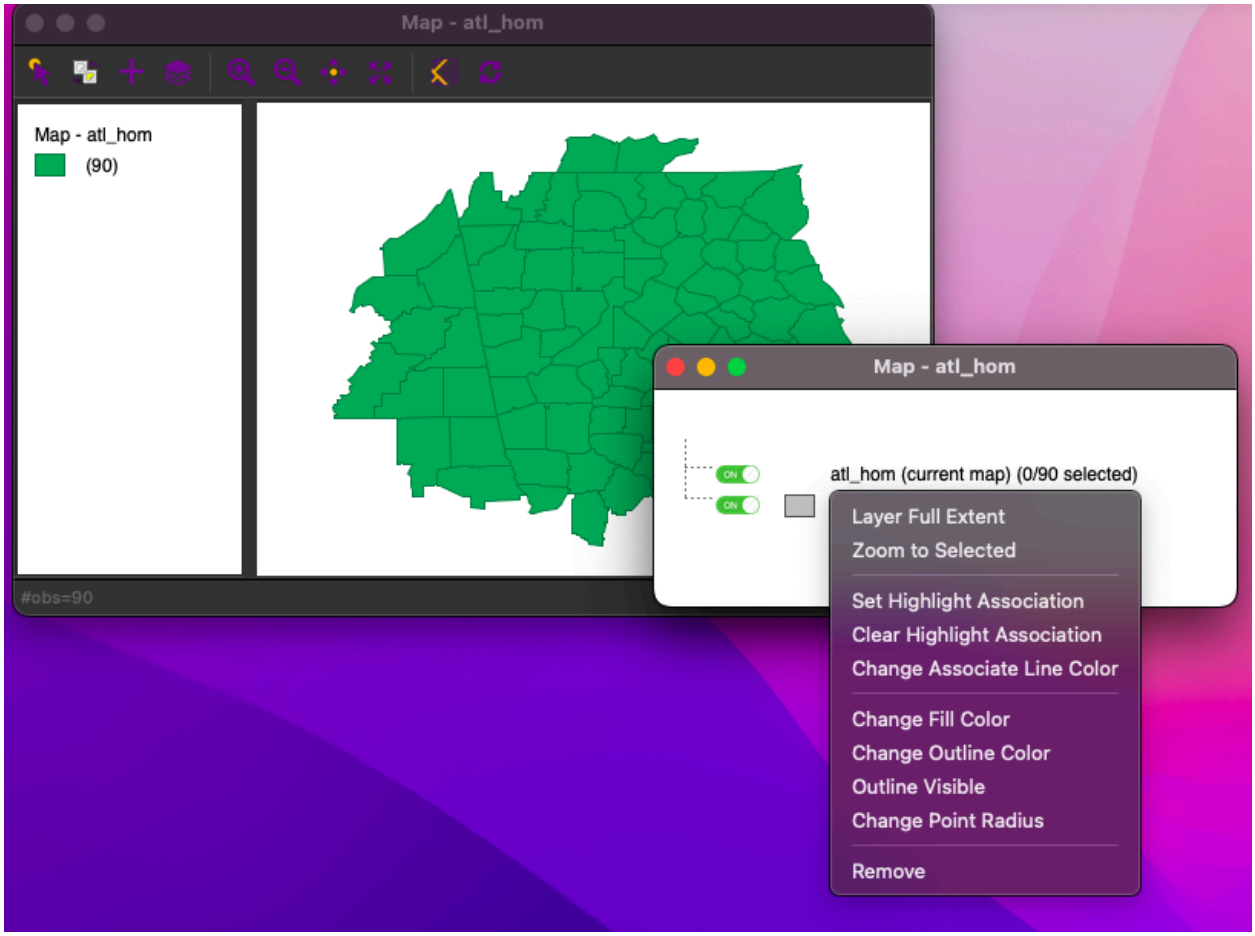


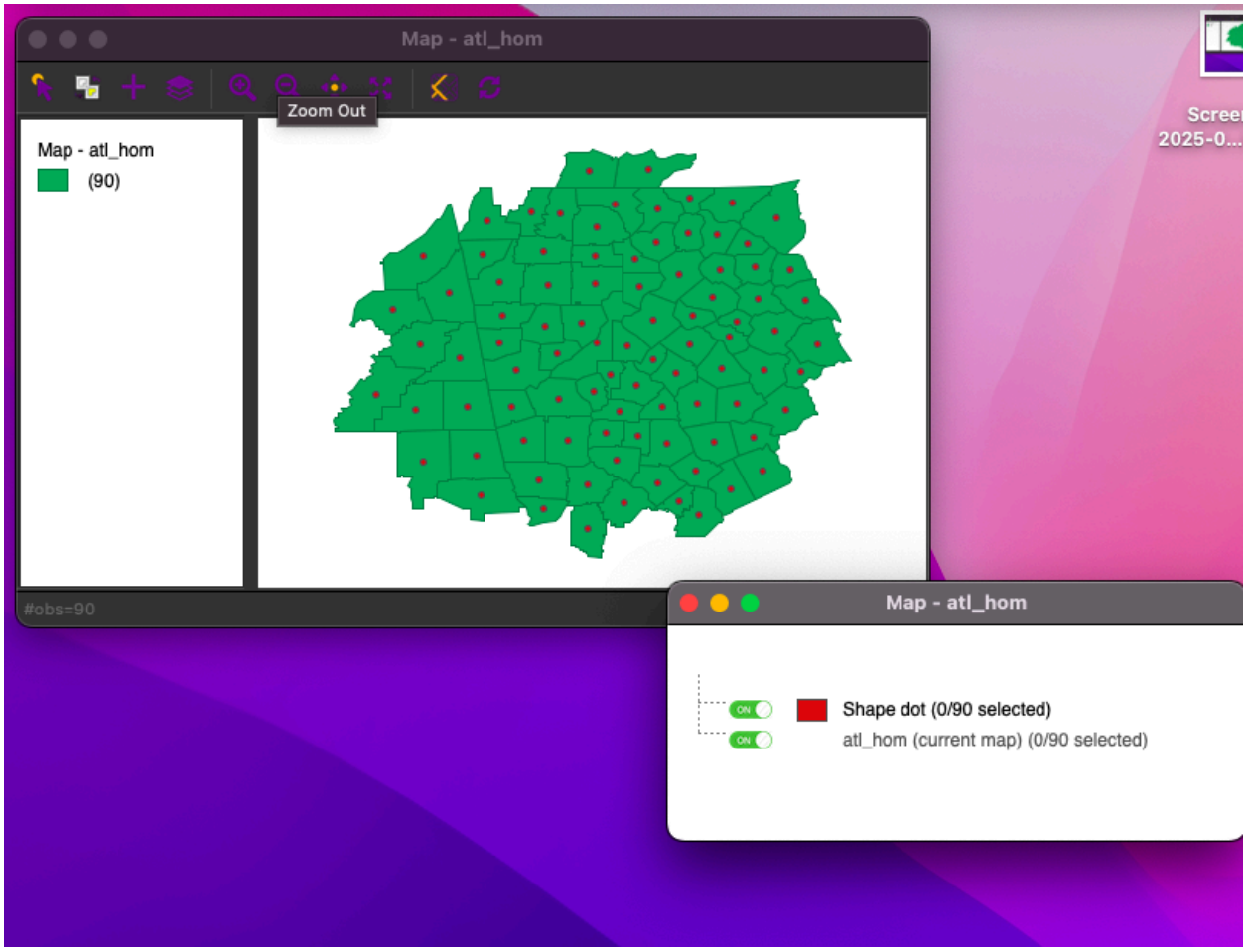
Used the Natregimes dataset to analyze:

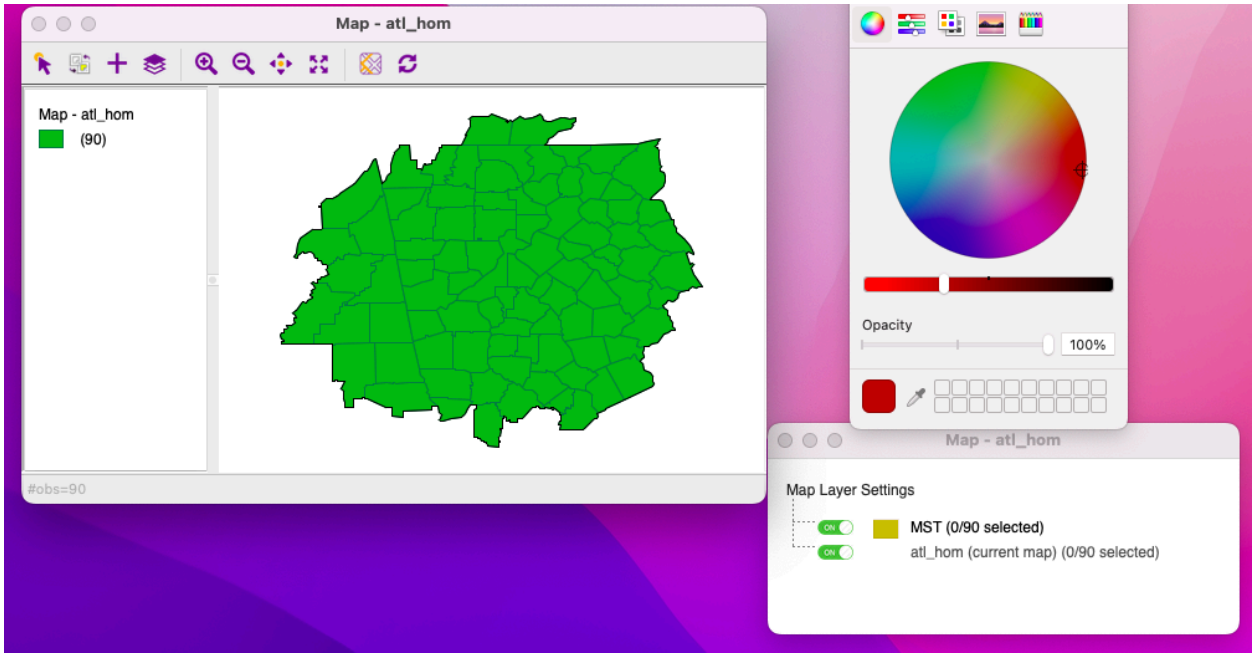
- *Spatially intensive variable: homicide count*
- *Spatially extensive variable:*

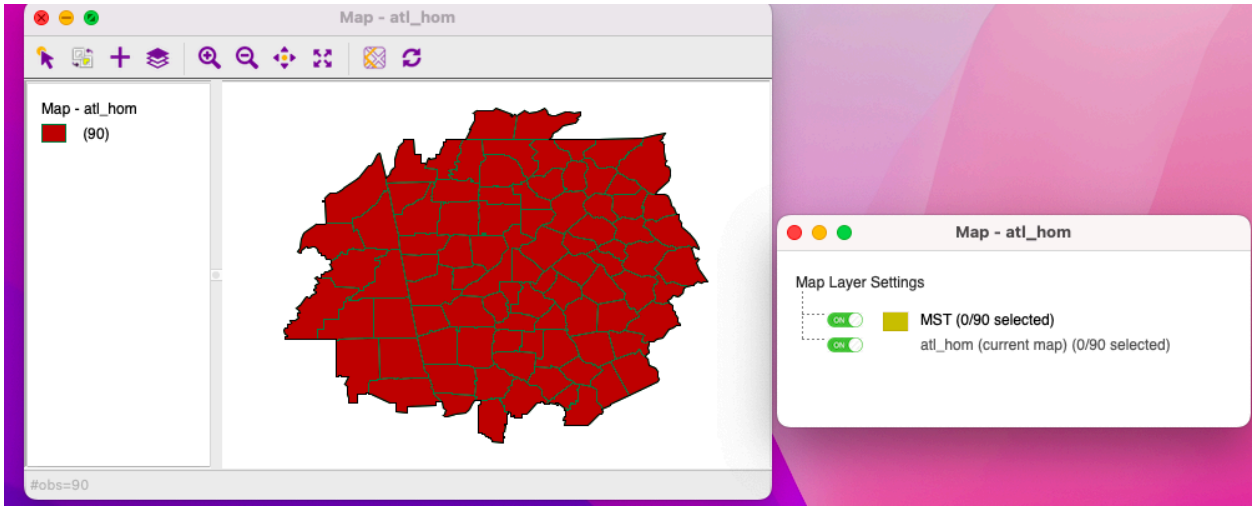


➢ ***Task 4: Try any other data operation to enhance the beauty and information in your spatial dataset, think about your own story! (Hint: multi-layer functions)***


Map - atl_hom
Map - atl_hom
(90)
#obs=90
Map - atl_hom
ON
ON
atl_hom (current map) (0/90 selected)
Layer Full Extent
Zoom to Selected
Set Highlight Association
Clear Highlight Association
Change Associate Line Color
Change Fill Color
Change Outline Color
Outline Visible
Change Point Radius
Remove


Map - atl_hom
Zoom Out
Map - atl_hom
(90)
#obs=90
Map - atl_hom
Shape dot (0/90 selected)
atl_hom (current map) (0/90 selected)


Map - atl_hom
Map - atl_hom
(90)
#obs=90
Opacity
100%
Map - atl_hom
Map Layer Settings
MST (0/90 selected)
atl_hom (current map) (0/90 selected)



Applied multi-layer functions to improve data visualization and insights.

*To improve the information content and usability of my spatial dataset, I applied the following operations in **GeoDa**:*

1. *Changed Outline Color – Adjusted the outline color of polygons to enhance visibility and distinguish boundaries more clearly. helps in differentiating between adjacent regions.*
2. *Added Centroids – Extracted the centroids of polygons to represent the geographic center of each area. useful for spatial statistics and network analysis, such as creating a Minimum Spanning Tree (MST) or understanding the distribution of points within polygons.*
3. *Displayed Only Map Boundary – Temporarily removed the fill color to focus solely on the boundaries. This visualization technique is helpful when overlaying multiple datasets to prevent clutter and maintain clarity.*
4. *Made Outline Visible – Increased the outline thickness and adjusted transparency to emphasize the spatial structure of the dataset, ensuring that boundaries remain clear when filled with different colors.*
5. *Changed Fill Color – Applied a different fill color (red) to improve contrast and make the spatial distribution of the data more visually intuitive.*

Why These MST layers Matter:-

- *Better Interpretation: Adjusting colors and visibility settings helps in making the map more readable and effective for analysis.*
- *Improved Thematic Representation: Categorizing fill colors based on attributes allows for a clearer understanding of spatial trends.*
- *Enhanced Presentation: A well-styled map is easier to communicate to an audience, whether for reports or presentations.*

➢ ***Taks 5: Make sure all operations in lab1a and 1b apply to your dataset***

Verified that all transformations, joins, and aggregations were successfully applied to the dataset.