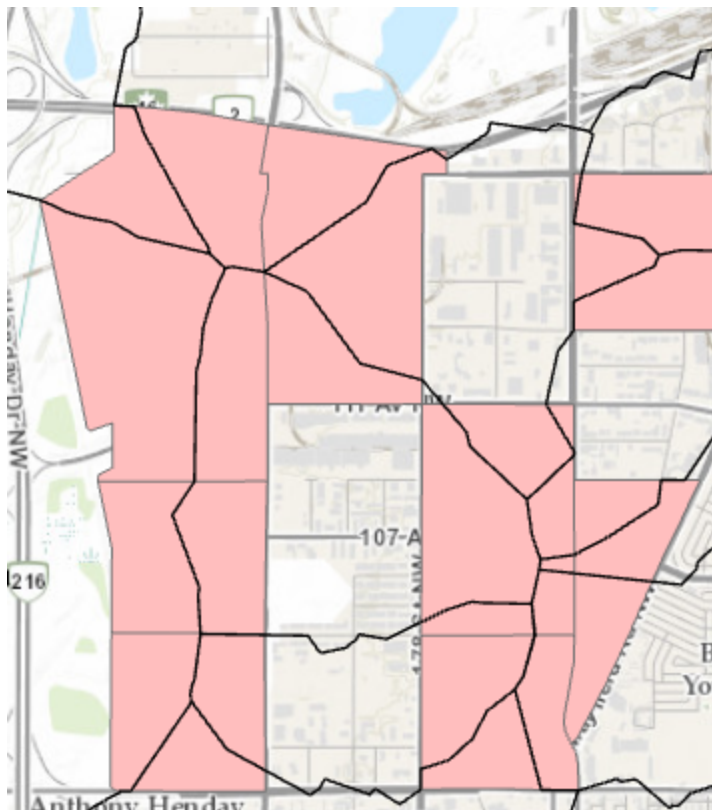# Questions and Answers for Lab 1: Exploring Linguistic Diversity

In this notebook you will find the questions asked of you in this lab. Beneath each question will be a blank (markdown) cell in which you can write your answer. If you require additional cells use the **Insert** menu to do so, and then use the **Cell** menu to change the **Cell Type** to **Markdown**.

Question 1: By setting the field type for NumPoints to Integer in Step 11, how does that affect the result of Step 12? What would the numbers look like if the field type had been set to one of the other data types such as float or double? (0.5 Marks)

Setting NumPoints to long (integer) made it a whole number instead of it being a fractional number with decimals ; if it was in float or double.

Question 2: Zoom into an area that contains `NoDataNeighborhoods` and the `OverLayAreas` (remembering to set clear fill for the latter layer; and turn off all of the other layers so that only the `OverLayAreas` , `NoDataNeighborhoods` and `Topographic` layers are showing). **Take a screenshot of the zoomed-in area to show how the `NoDataNeighborhoods` will be divided by the Thiessen polygons**. Include that screen capture in your lab submission. You can easily insert an image into a Notebook by clicking on `Edit` and selecting `Insert image` (0.5 marks)
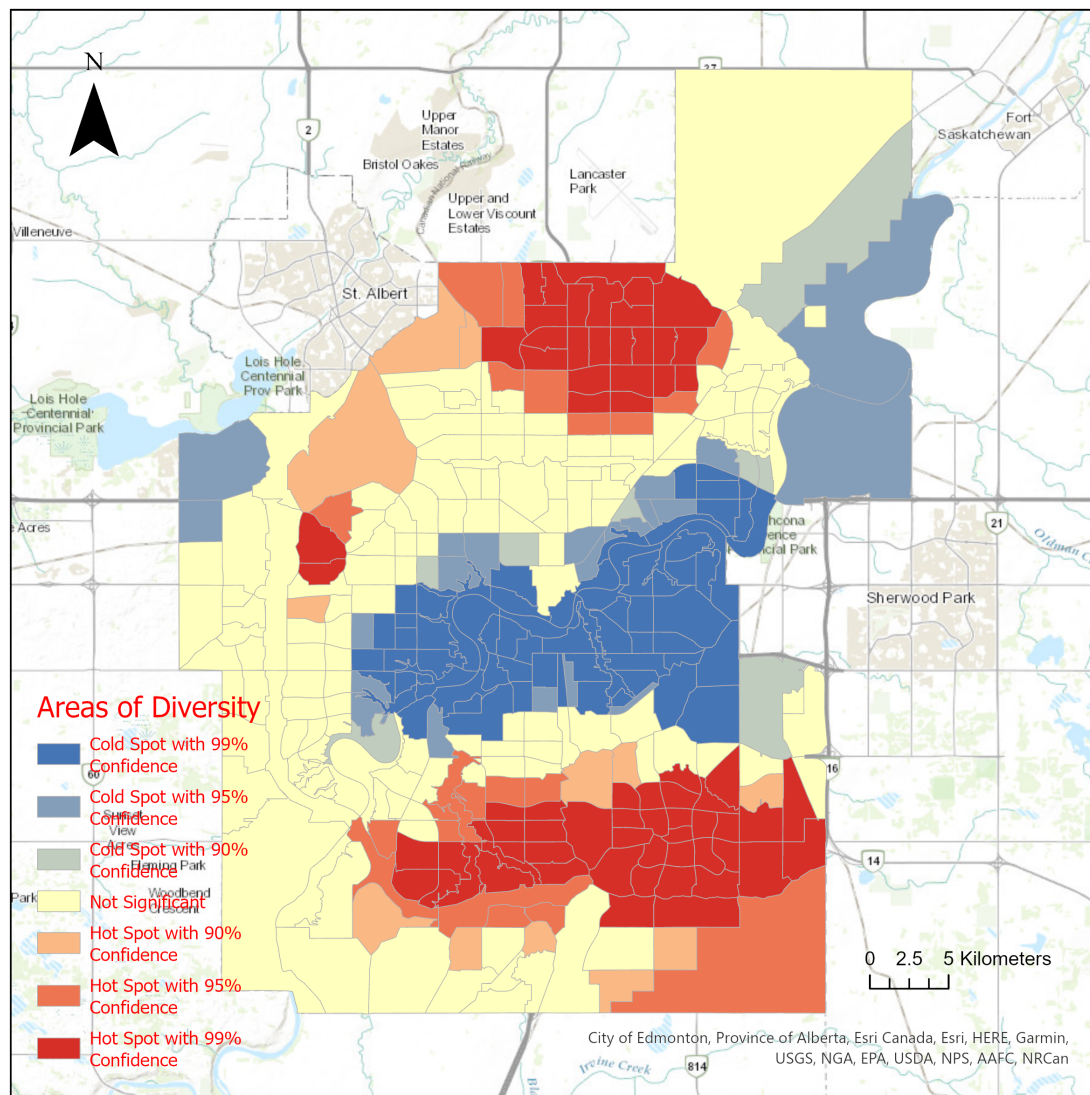
Question 3: How many sliver polygons are identified in the Select Layer by Attribute operation? (0.5 Marks)

11

Final step of Part 1!

Please create a formal map layout showing the Edmonton hotspots map. Add the usual text to the map (e.g., a proper title, your name, the date, a scale bar, etc.) Inserting your map into the cell below likely requires you to export it as a PNG file, not the more typical PDF. **The finished map needs to be submitted as part of this lab. (5 marks)**
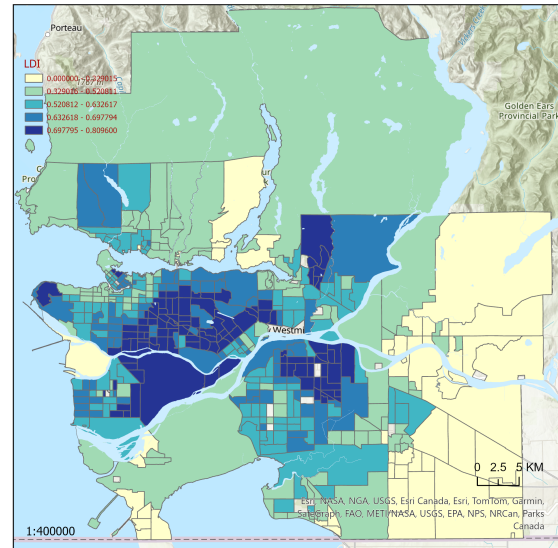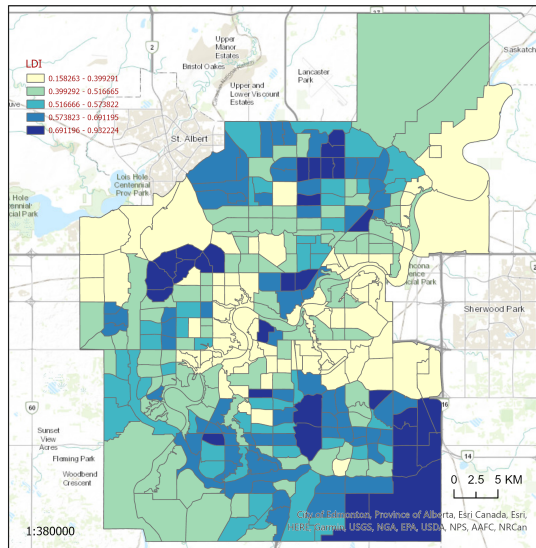
Linguistic Diversity of Edmonton

Areas of Diversity

- Cold Spot with 99% Confidence
- Cold Spot with 95% Confidence
- Cold Spot with 90% Confidence
- Not Significant
- Hot Spot with 90% Confidence
- Hot Spot with 95% Confidence
- Hot Spot with 99% Confidence

0   2.5   5 Kilometers

City of Edmonton, Province of Alberta, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan

Jeffery Liao
GEOS 370 Lab L2C
01/25/24

Map 2: Create a layout showing the two LDI maps side-by-side (think about the orientation of the page when creating this layout--should it be portrait or landscape?). The finished map is to be subitted as part of this lab. (5 Marks)

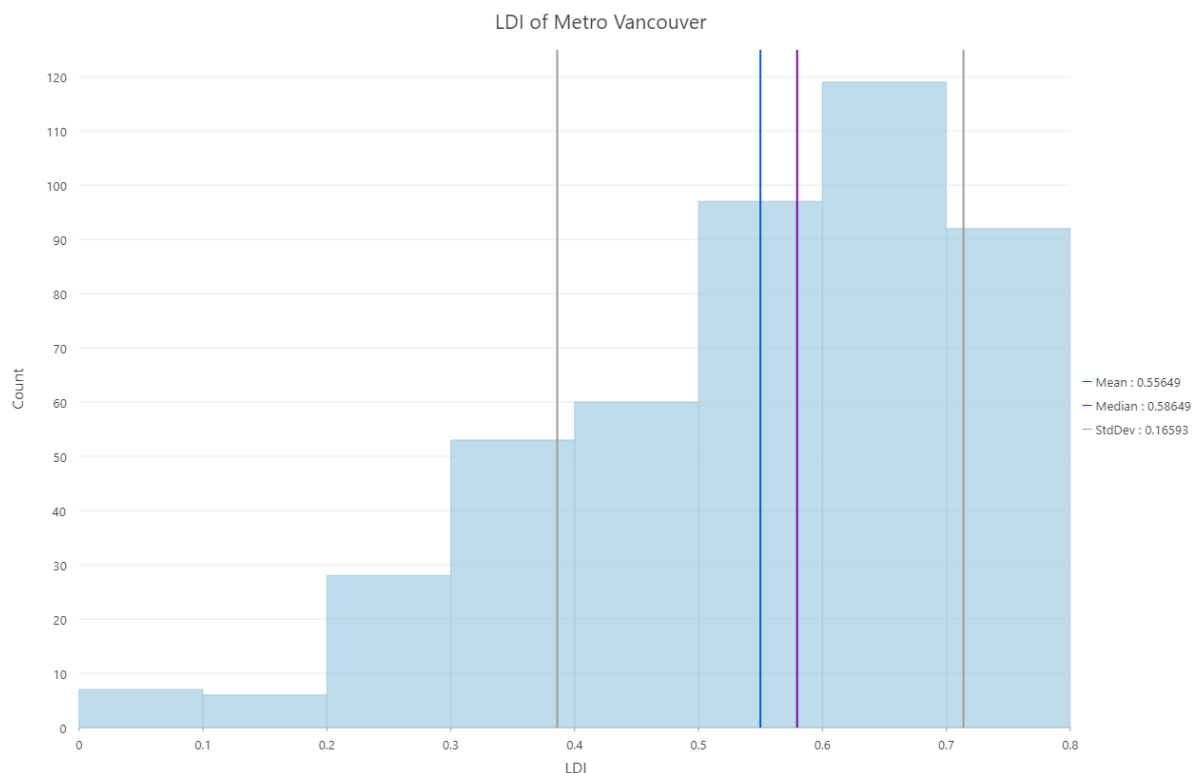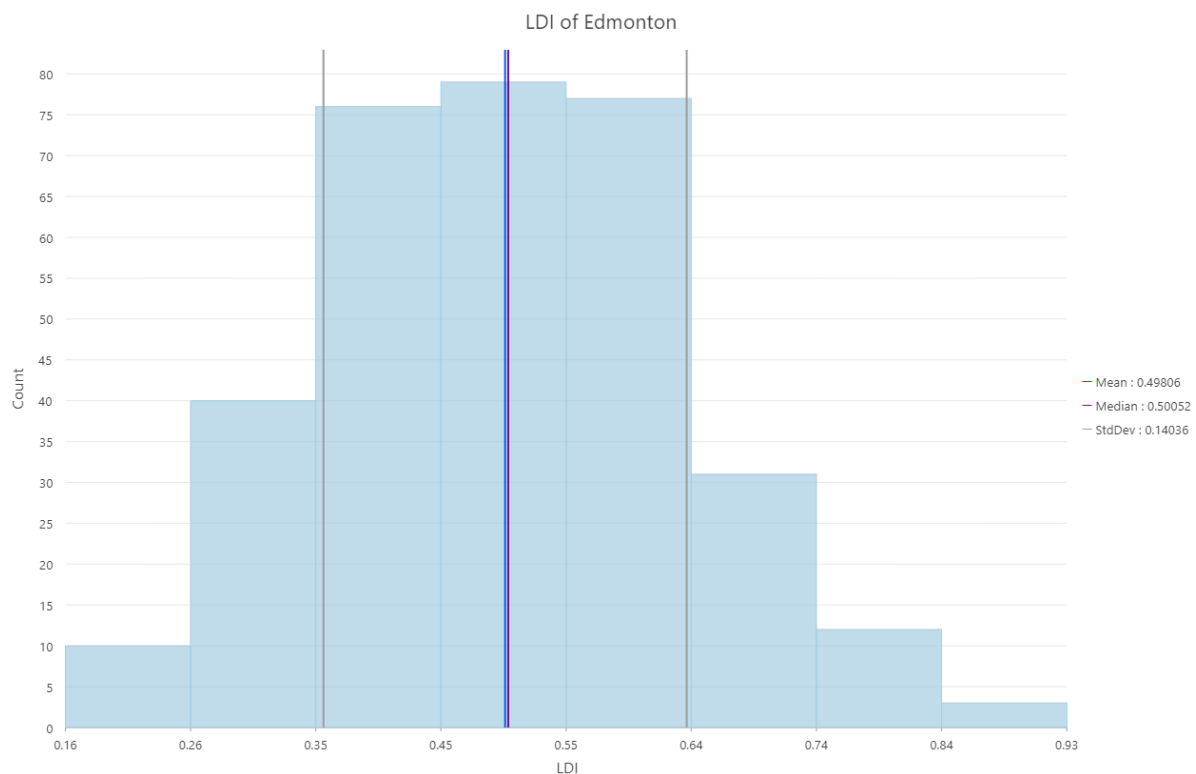## Linguistic Diversity in Edmonton and Metro Vancouver Based on LDI

Jeffery Liao
GEOS 370 Lab L2C
01/25/24

Question 4: In comparing the two LDI maps, what are some of the issues that you run into? That is, do differences in the map legends make a direct comparion difficult? (1 Mark)

Include the two histogram (produced when conducting the `Optimized HotSpots Analysis`) in your Questions&Answers Notebook as well, and comment on their differences. You should provide meaningful titles for the two charts. Export the charts as PNG's and then `Edit` > `Insert Image` them into the Notebook. (1 Mark)

Comparing the two LDI maps there is some differences in the intervals. The map legends has intervals that aren't the same to each other making it hard to compare the two maps. The computation of the diversity index is based on the population of each language as a proportion of the total population. There is a higher interval of LDI in Edmonton (0.7 - 0.93) which means areas have low populations and lots diveristy.

LDI of Edmonton

Mean : 0.49806
Median : 0.50052
StdDev : 0.14036

LDI of Metro Vancouver

Mean : 0.55649
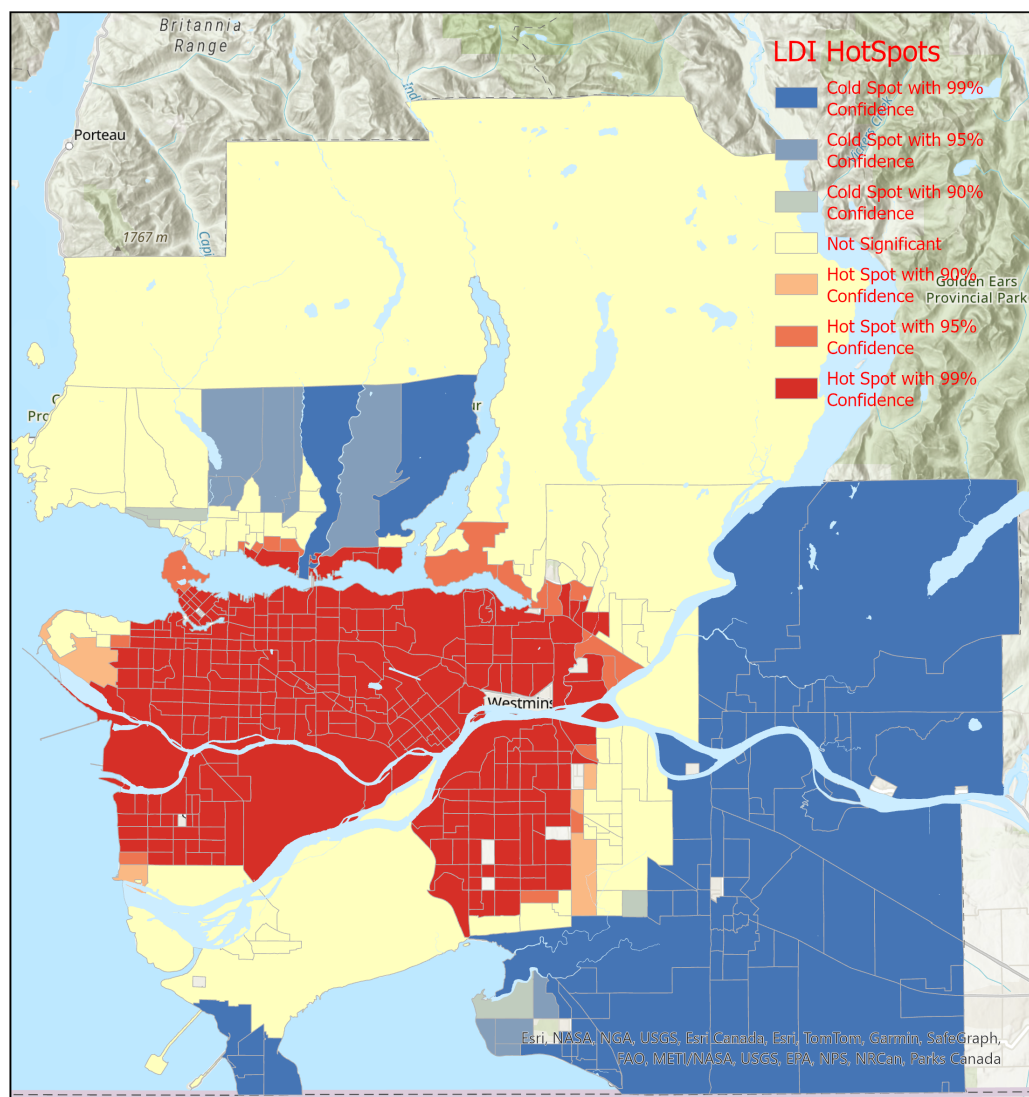Median : 0.58649
StdDev : 0.16593

We see in the histograms there is a left skewed histogram of LDI in Metro Vancouver which means more diversity of speaker that have a different mother tongues. Edomonton's histogram of LDI is more normally distrubted. The higher mean in Metro Vancouver means there is a lot more speakers of different lanuguages than Edmonton.

Map 3: Create a new Layout showing the hot spots map for Metro Vancouver (Using the same Optimized Hot Spot Analysis tool as before). Make the map understandable to a reader who

doesn't know exactly what you have done or why, and have it be done with good design. **The finished map is to be submitted as part of this lab**. (5 Marks)

Linguistic Diversity of Metro Vancouver

Areas that are blue means there is a population that mostly everyone has the same mother tongue.
Red areas represents populations that a lot of people do have the same mother tongue.
In Metro Vancouver we see a major spatial correlation in areas of cold and hot spots, meaning that there is homogeneity within areas.

Jeffery Liao
GEOS 370 Lab L2C
01/25/24

Question 5: What do the differences in the two hot spots maps tell us about the nature of the diversity of the two cities? (1.5 Mark)

The diveristy of language of Metro Vancouver is mostly centered in one area, while in Edmonton it is more spread out into two areas. Postitive spatial correlation occurs when similar values

occur near one another. Both maps are example of that but Metro vancouver is more spatial related than Edmonton. Negative spatial autocorrelation occurs when dissimilar values occur near one another. We can define hotspots into 3 catergories:

1. Locations with high values of the phenomenon and high level of similarity with its surroundings (high-high) defined as hot-spots (Red)
2. Locations with low values of the phenomenon and low levels of similarity with its surroundings (low-low) defined as cold-spots (Blue)
3. Locations with high values of the phenomenon and low levels of similarity or vice-versa. These are known as spatial outliers (Yellow)

The difference between the two hot spot maps tells us that diveristy is mostly centered around a couple of areas mostly high residential areas for metro vancouver and north and south for Edmonton.

> Note: The marks above add up to 20 for convenience. The conversion from here to the 10 points on Canvas for this lab is found by `Canvas Score = Marks/2`

Submitting the Notebook as a PDF

In the newer versions of ArcGIS Pro, ESRI has introduced a way of exporting notebooks into a format that more people can view.

Under `Export` you'll find `Export to HTML` . Do this.

Once you have an HTML file produced, you can double-click on it and it should open in your default web browser. Your web browser then has the ability to 'Print' this file, NOT on paper, but as a 'PDF' file.

Please submit this file in PDF format under the Lab 1 assignment on Canvas!

Congratulations!

In [ ]: