## Spatial Autocorrelation Analysis Lab Questions

### Question 1

Using the Columbus dataset, perform a global spatial autocorrelation analysis on the housing values (*HOVAL*) variable using queen contiguity weights.

1. Calculate Moran's I, interpret the results, and create a Moran scatterplot.
2. What does the result tell you about the spatial distribution of housing values in Columbus?

### Question 2

Create LISA cluster maps for both income (*INC*) and crime (*CRIME*) variables using rook contiguity weights.

Compare the resulting maps and discuss the differences in spatial clustering patterns between these two variables.

### Question 3

Perform a Getis-Ord Gi\* hotspot analysis on the percentage of housing units without plumbing (*PLUMB*) using distance-based weights.

Set your distance threshold to ensure each neighborhood has at least 3 neighbors. Identify and map the statistically significant hotspots and coldspots. What spatial patterns do you observe?

### Question 4

Compare the results of spatial autocorrelation analysis for the open space variable (*OPEN*) using three different spatial weight structures: **queen** contiguity, **k=4** nearest neighbors, and **distance-based** weights. Create a table showing Moran's I values and p-values for each weight type.

How sensitive are your conclusions about spatial patterns to the choice of spatial weights? Which weight structure would you recommend for analyzing this variable and why?