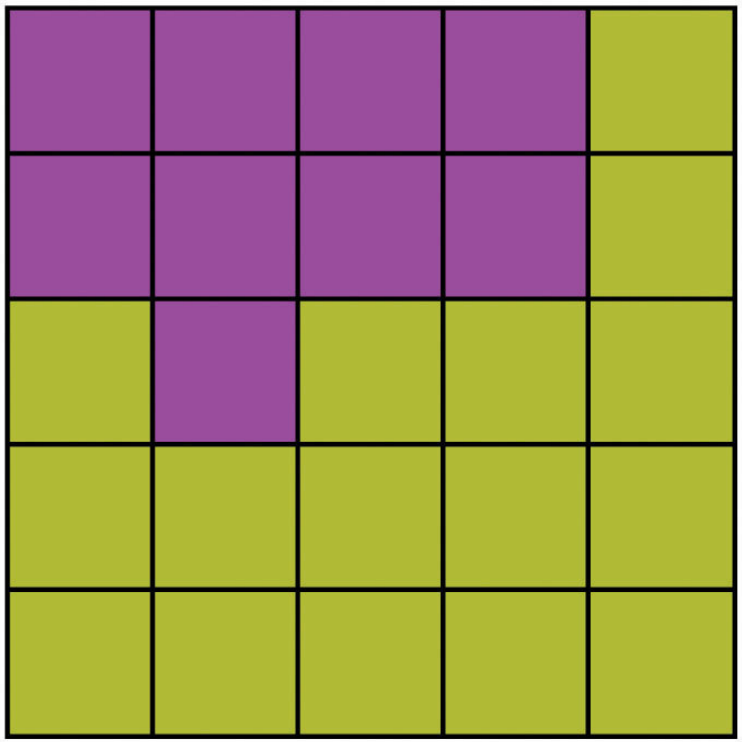
dive into GeoDa: Menu-Education-GeoDa

- GeoDa documentation (and free download):
  - https://geodacenter.github.io/documentation.html
  - https://s3.amazonaws.com/geoda/software/docs/geodaworkbook.pdf
  - condensed, to the point, hands-on:
    https://s3.amazonaws.com/geoda/software/docs/geoda_1.8_2.pdf
- get Columbus neighbourhoods and unzip:
- https://s3.amazonaws.com/geoda/data/columbus.zip
- File-New Project-From-ESRI Shapefile
- Map-Quantile Map, do '5', 'CRIME'; just like qgis
- Map-Percentile Map: 'CRIME' detect outliers/extremes

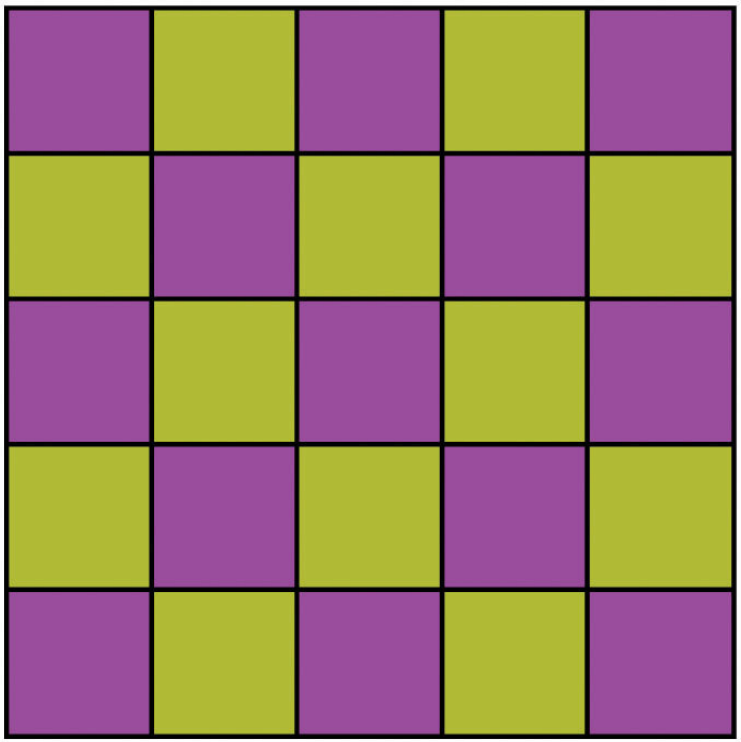
pos and neg

◇

POSITIVE : Pattern of Similarity



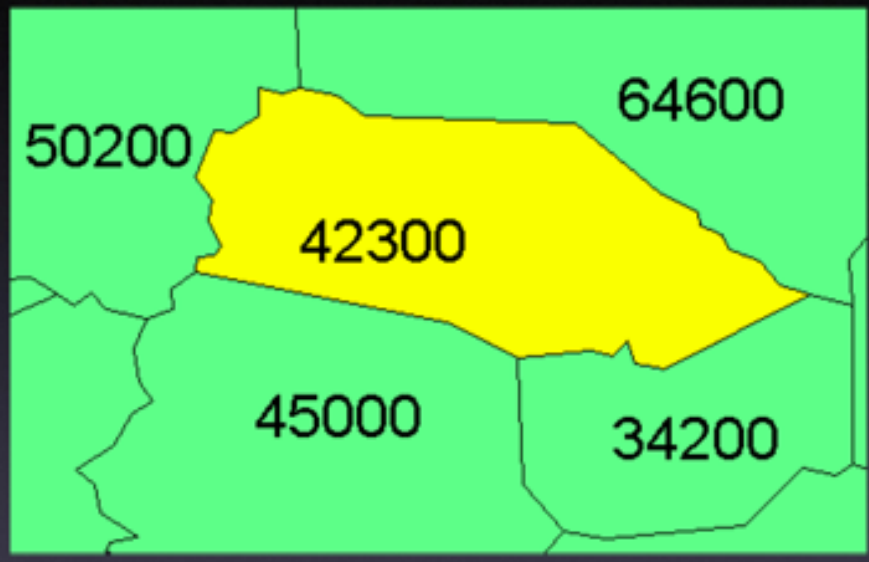
NEGATIVE : Pattern of Dissimilarity



spatial weights: the first step

- for spatial corr need spaital weights
  - need to spatially lag a variable, or define one's neighb
- like time lagging a variable
  - eg corr of unemployment last year with this year's poverty
- spatially lagged: corr of place with its neighbors
  - spatially lagged var: avg of values for its neighbors
- `https://geodacenter.github.io/workbook/4a_contig_weights/lab4a.html`

Spatial Lag Example



Average Neighbor Land Values

1/4x50200 + 1/4x45000 + 1/4x34200 + 1/4x64600

create weights

- Tools-Weights Manager-Create
- Weights File ID Variable: POLYID
  - usually fips or some unique ID/KEY var identifier of a place
  - (i think it must be numeric)
- and now the key part: defining neighbors

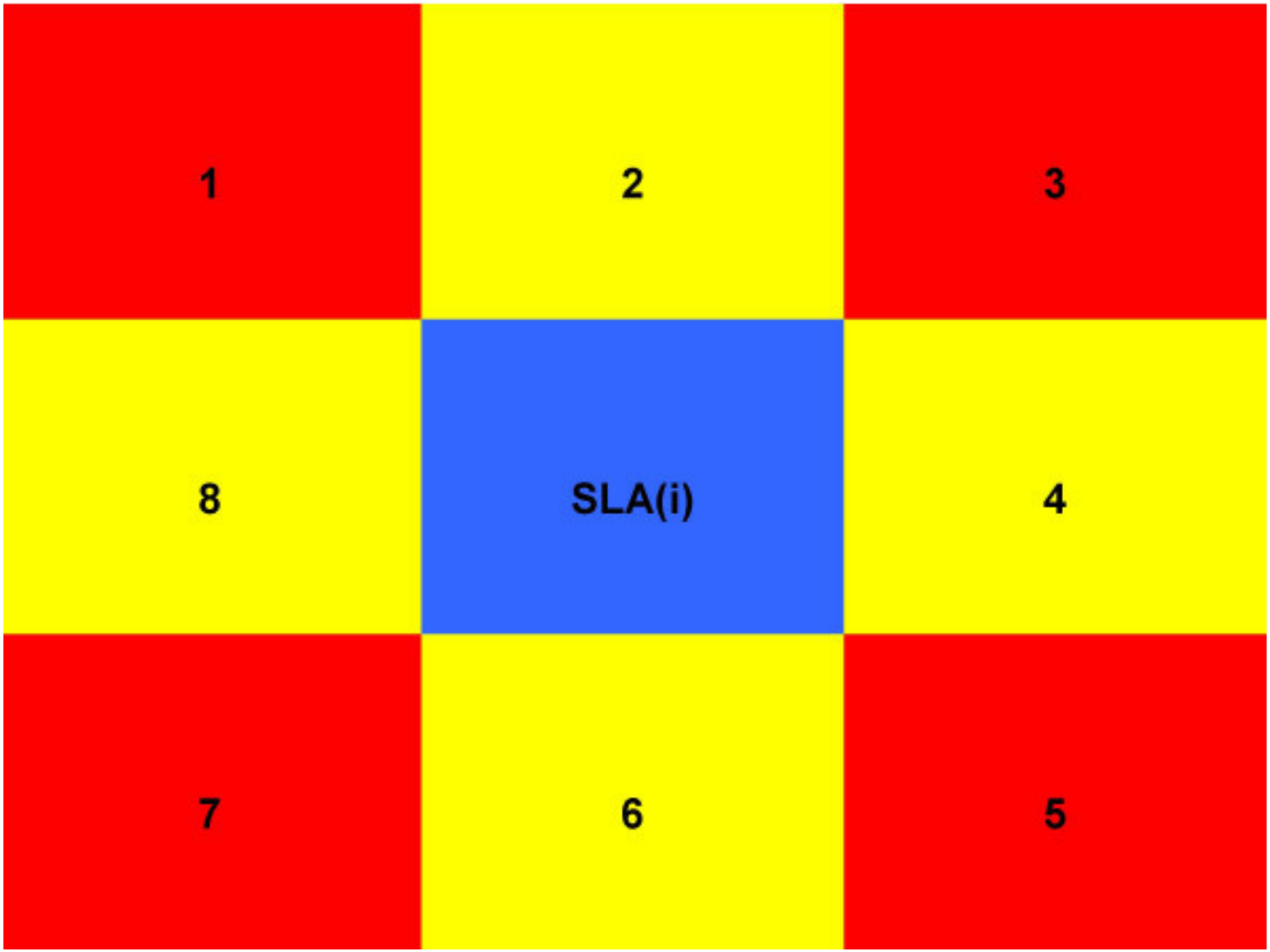
2 ways

- contiguity based (we'll just do these):
  - neighbor of place A touches on place A
- distance based: neighbor of place A is within some distance of place A

2 types of contiguity weights

- usually just pick queen contiguity
  - neighbor is any place that neighbors our place
  - at least must share a vertex, say North, North-East, etc
- can do rook: must share a border, not just vertex
  - so *not* North-East

rook v queen



- Rook: only 2,4,6, 8; Queen: all (i.e. 1-8)

order of contiguity

- in geoda can choose higher orders
- i.e. neighbors of my neighbors are my neighbors...
- we'll just stick with 1st order

hit Create [sometimes need to click around first!]

- note it will create txt file with extension .gal
  - navigate to where you saved .gal file
  - right click it and open with say Leafpad

gal file

- line 2: '1 2': POLYID 1 has 2 neighbors
- l3: '2 3' and these neighbors are POLYID 2,3
- l4: '2 3': POLYID 2 has 3 neighbors
- l5: '4 3 1' and these are POLYID 4,3,1
- and so on
- do map exploration:
  - Tools-Weights Manager-Connectivity Map

Moran's I

- make sure got weights selected: Tools-Weights-Select
- just like regular corr (from -1 to 1)
- Space-Univariate Moran's I: CRIME
- and it's .5 meaning that
  - there is a moderate positive spatial autocorr in CRIME
- we've expected that from thematic map
- note that y-axis is lagged crime
- select some obs and discuss: its and its nei crime
  - see in a map; select some other obs that is diff

Moran's I

- i can also rectangle select points in scatterplot
- let' select those in top-right (hi-hi): central city
- now bottom-left (lo-lo): outer areas
- now outlier in top-left (lo-hi: low crime but hi crime around)
- let's look back at thematic map–indeed that place is low crime
  - but its neighbors are high crime
- there isn't a clear outlier with hi-lo at bottom right

LISA

- LISA is a Local Moran's I
- Space-Univariate Local Moran's I: CRIME
  - hit OK, just all three maps selected
- it nicely identifies clusters
- again, compare with thematic map
  - put these into your paper/presentation incl scatterplt

so what?

- Moran's I and LISA help make sense of thematic maps
- they identify patterns, clusters, outliers, and put # on it
- very useful !
  - eg is poverty, happiness concentrated ?
  - to what degree? where?
  - which places don't fit the area (outliers)?
  - and it does matter where in the cluster one is located!
- eg being poor in the middle of poverty may be better
- than being poor next to rich
- suicide among females in rural china:
  - not absolute but relative deprivation