



Background

Perhaps the most uniquely powerful function of GIS is its ability to combine data at different scales and in different formats. No other software package allows you to combine, say, ZIP codes, census tracts health district and voting precincts with street address data.

Most importantly, the spatial join tool allows us to get counts of things (like robberies, or liquor stores) per spatial unit (like a ZIP code or census tract). It also allows us to assign neighborhood characteristics, (like the median household income of a census tract) to point data (like the address of a crime incident).

This is not a difficult task, but it is crucial that you understand why and when to choose specific options in the process.

Skills

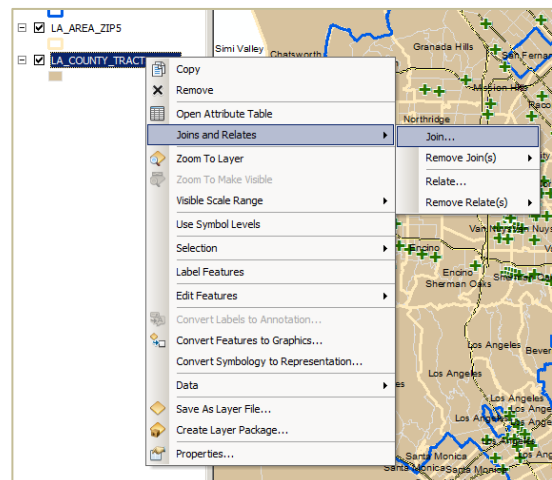
You will demonstrate two strategies commonly used to geocode data, and demonstrate an ability to gather address data from a database.

1. You will demonstrate an ability to use the spatial join tool in ArcMap GIS.
2. You will correctly choose the appropriate options to maximize the utility of the tool, using both the 'sum' and 'count' options.
3. You will join files using point-to-polygon, polygon-to-point and polygon-to-polygon options.

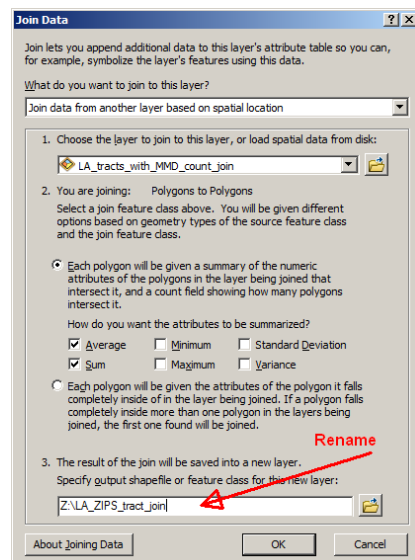
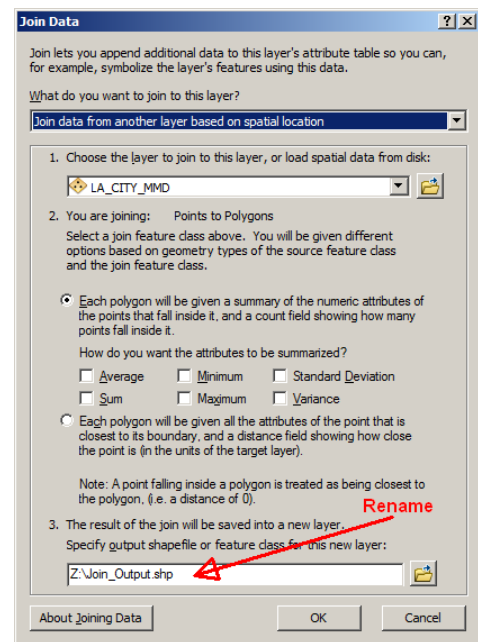
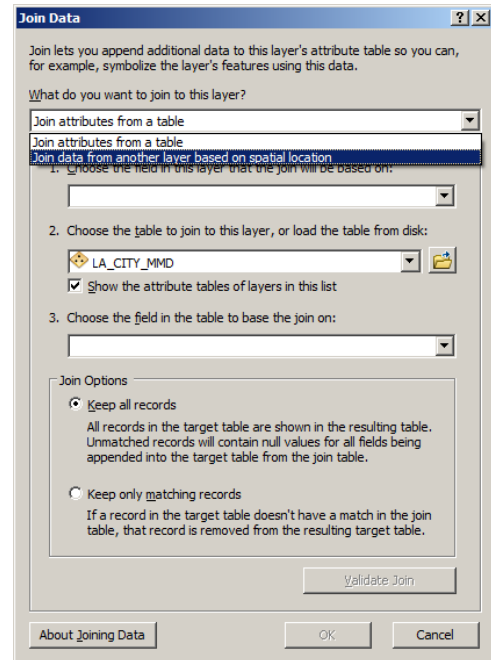
Your Task

You will join data from different layers using the spatial join tool.

1. The base project file for this lab is in the Y drive in the Forensic Geography folder. Open ArcMap and open the project file called "LA_MMD" . It's a map of all the medical marijuana dispensaries in Los Angeles. The data was downloaded from the Los Angeles Times website.
 - a. (Y:/COURSES/COURSES_SGRAVES/FORENSIC/LA_MMD.mxd)
2. First you will create a new file in which you get a count of medical marijuana dispensaries (MMDs) per census tract. Start by right clicking on the layer "LA_COUNTY_TRACTS_2010".
3. Select Joins and Relates from the drop down menu.
4. Select Join...



5. In the Join Data window, make sure you select from the top option window “Join data from another layer based on spatial location”
6. The join data tool will generally, by default, find a point layer to join to the polygon layer you have selected. It makes most sense. So by default the LA_CITY_MMD layer was selected. This is OK.
7. You will NOT need to select any additional data to be summarized by the software. A simple count of MMDs per census tract is satisfactory in this instance, partly because there is *no additional* data in the MMD file. If we had sales data, for instance, then it would make sense to also select “sum” and maybe “average”, etc.
8. Name your file something like “LA_TRACTS_MMD_join”
9. Click OK. Note that your new layer has been generated at the top of the Table of Contents.
10. Now map your new census tract layer by number of MMD’s. Right click on your new layer. Select properties from the drop down menu. In the symbology tab, select “Quantities”. From the value fields select “Count_” ...that’s the new column you just made.
11. You may want to select also “Equal Intervals” and make 9 classes .(0-8) ...making the 0 range class transparent (no fill color). You might want to make the top class (the census tract with 8 MMDs) another color, like red, to indicate that it is different.
12. Identify the name of the city (neighborhood) that has the census tract with the most MMDS. Zoom in on it, and grab a screen capture (Ctrl+Alt+Print Screen) of this area. Paste the screen shot into a Word file (save it as Lab5_yourname.doc). Caption the image with the name of the neighborhood, the number of MMDs.
13. Next, you will attempt to get a count of MMD’s by ZIP code by joining your new layer to the LA_AREA_ZIP5 layer.
14. Right click on the LA_AREA_ZIPS5 layer in the Table of Contents. Select Joins and Relates/Join, just as you have done before, but this time chose from the list of layer in



step 1 your new census tract map with the joined MMD count.

15. Note that in step 2 ArcMap notifies you that you are joining Polygons to Polygons. You should be aware that this strategy will work reasonably well, but that there are some issues that can arise. Your instructor will discuss this in class.
16. Select both "Average" and "Sum" from the menu options in Step 2.
17. Rename the file something like "LA_ZIPS_tracts_join". Click OK and examine your map.
18. Right click on the new ZIP code layer and open the attribute table. Scroll right. Notice that you have a "count" column which indicates the number of census tracts in each ZIP; a "sum_count" column which is the number of MMDs per ZIP; and a "Avg_Count" column, which is the average number of MMDs per tract in each ZIP.
19. Right click on the "Sum_Count" column header. Select "Statistics" from the drop down menu. NOTE that the software reports 936 MMD's...which is far in excess of the number on your map (427) because some census tracts intersect (touch) multiple ZIP codes; which in turn causes double/triple counting in some instances...BUT STILL, this figure is useful because it provides a sense of local access to MMDs by ZIP code.
20. Map the number of MMD's per ZIP code using the Sum_Count column. Zoom in on the ZIP code that have the largest number of MMDs in adjoining census tracts. Grab a screen capture of the neighborhood with the largest "sum count"...or MMD's in the ZIP area. Paste it you're your word file and caption it with the name of the ZIP code and the number of MMD's within and adjacent to this ZIP code.
21. The last new layer you will create will to join polygon data to the point file. Right click on the LA CITY MMD layer. Select Joins and Relates/Joins again.
22. Join it to your LA_TRACTS_MMD_join file and select the "is closest to it" option. Note that you're joining Polygons to Points. Name this new file "LA_MMDS_with_tract_data". Click OK. Examine your new map.
23. Right click on this new layer, bring up properties and make a graduated symbol map using "Count_" and normalize it by ALAND10 (land area) to give you an idea of the competition per square mile. Zoom in and grab a screen capture of the area within the San Fernando Valley that has the highest competition per square mile. Paste it in your Word document an caption it with the name of the neighborhood and note that this is where the competition is most dense.
24. Email your word document to your instructor before the deadline.

