advanced qgis

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outline

geocoding

SQL

geo-processing

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geocoding: address→(lat,lon)

- say that we have some addresses and we want to geocode
  them
- https:
  //sites.google.com/site/adamokuliczkozaryn/
  gis_int/apartments-for-rent.xls
- open, looks reasonably clean, save as csv

MMQGIS-Geocode

○ MMQGIS-Geocode-Geocode CSV with Web Service

○ Input CSV, and make sure Address Field, City Field, State Field are right; best if you give more info

○ Web Service: OpenStreetMap/Nominatim

○ make sure notfound.csv (and output shp) saved where you can write!

● ref: https://mangomap.com/blog/
how-to-make-a-web-map-from-a-list-of-addresses-in-a-spreadsheet/

●

● note as of qgis 3.5, it seems to work fine to have everything just under address!

○

● btw, if already got X/Y lat/lon:

geocoding first add your csv with "Add Delimited Text Layer" tool

important to check!

- add basemap to check location
- does it make sense? houses in river or park?
- zoom-in to street, click some points with "identify tool": pop-up address–does it match with the street?
- usually some miscodings, say few percent
- usually because the address is misspelled or incomplete
- do see notfound.csv: mostly those with a range of street numbers
- need to fix them/adjust them:
- to check can just google them and see if you get a clean hit, and adjust accordingly to get it clean, and then change in csv

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SQL: Structured Query Language

- full blown (not in qgis) SQL is only little more complicated
- very much English-like, just with some strict syntax rules
- also a job market skill: put 'basic SQL' on your linkedIN next to 'gis' skill
- very easy to master in no time
- https://www.youtube.com/watch?v=jJeae7PJVv4

advanced filter (expression): SQL

- nj_counties-Open Attribute Table
- bottom left box- "Advanced Filter (Expression)"
- Fields and Values "REGION"
- and on the right Load values: "all unique"
- then we can type
- "REGION" = 'CENTRAL' and hit OK
- now easy to modify at the bottom of table, say:
- "REGION" = 'CENTRAL' OR "REGION" = 'SOUTHERN'
- "REGION" = 'CENTRAL' AND "POP2010" > 598349

regular expressions

- can also match part of a string:
- regexp_match("COUNTY",'C.*N')
- regexp_match("COUNTY",'^C.*N') must start with 'C'
- regexp_match("COUNTY",'^C.*N$') and end with 'N'
- then can hit ctrl-a to select all data
- right click layer, save as (check "selection")

saving selection often necessary

- keep in mind simplicity principle!
- drop all unnecessary clutter
- do not map things that you don't care about

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this is a whole bag of tools

- we switch gears a little and discuss
- more advanced topics beyond mapping
- more like typical GIS/IT stuff
- we will just cover few tools
- there are dozens of them
- you may present some of those for extra credit
- let me know– some may not be useful for this class
- those that i think are especially useful are covered below
- most are under 'Vector', and also 'Plugins'

dissolve

- nj_counties
  https://docs.google.com/uc?id=1xJDhcRCkgv7k4tNCa72Oog5bohV6dTB2&export=download
- dissolve into a larger area
- (get rid of inside boundaries)
- Vector-Geopocessing Tools-Dissolve
- nj_counties
- uncheck "Dissolve all"
- otherwhise it will dissolve all
- "dissolve field:" REGION

dissolve your way

- can dissolve into your own categories/definitions
- let's take regions and dissolve into south and north jersey
- Open attribute table-toggle editing-New column-integer: 'southNorth'
- ○ sort on REGION and mark southern regions with 1, and the rest with 0
- ○ may also highlight the row to see which county is where
- Vector-Geopocessing tools-Dissolve
- "Dissolve field:" southNorth
- often you will have to do something like this
- no way to find a shapefile for South Jersey online!

simplify polygons

- remember from principles: simplify as much as possible

- simplifying polygons means dropping vertexes, so that polygons are defined by fewer coordinates `draw`

- it reduces size of a file

- Vector-Geometry tools-Simplify geometries

○ Input: 'nj_counties'

- play with "tolerance" to achieve desired simplicity

○ try 1000–turn off/on to compare to orginal: see the difference?

○ can also simplify lines (fewer nodes)

- and i guess you can also simplify points (fewer dec points)

○ reference http://gis.stackexchange.com/questions/25914/how-to-smooth-generalize-a-polygon-in-qgis

centroids

- calculate a center of a polygon or turn polygon into a point
- useful when merging non-overlapping polygons–say
  congressional districts and counties
- then you can calculate centroid of one of those and merge
  with polygons of the other layer if a centroid is in that
  polygon using spatial merge
- draw a picture
- Vector-Geometry tools-Polygon centroids
- Input: nj counties

centroids

- note: the new shapefile will have the same data
- can now map another variable and overlay on another variable
- can map both points and polygons with some symbology
- let's map population for polygons
- ○ and population density for points
- ○ note: make points bigger to see symbology well
- this solves the problem of showing 2 vars in one map

buffering

- kind of opposite of centroids:
- buffer (circle) around a point or poly or line; eg:
- 'dry zone' around schools
- waste processing plants and houses
- 2-mile heavy pollution around hwy
- walkability to healthy stores, etc
- load nj universities
- https://sites.google.com/site/adamokuliczkozaryn/gis_int/hsip_colleges.zip
- Vector-Geoprocessing Tools-Fixed Distance Buffer
- use 20,000 feet (buffer size is in map units)
- Properties-Metadata or even -General: unit is US ft
- note: buffer is a new layer and then can spatially merge it
  with another layer

measure line tool

- note different measuring units
- measure distances–how far from a point to point
- measure radius to make sure it is right
- and measure say joging route in segments from RU to 8th and market
- note we will do the same in google maps

example: environmental problems around univ

- download and add to qgis
  ○ https://docs.google.com/uc?id=1T_n1y_
    Mj5yQiWpZwrbuuFFwmIVJ2QWFZ&export=download
- make smaller, say size of .4 so can better see

MMQGIS-Combine-Spatial Join

- Output: Buffer
- Spatial Operator: Contains
- Data (Join) Layer: NJ contaminated sites
- Attribute Operation: Sum
- Fields: NAME

investigate

- open attr table of merged shapefile
- go to last column 'COUNT' and click 2x to sort descending
- under 'NAME' we find that 'NEW JERSEY MEDICAL SCHOOL'
- has biggest problem! over thousand contaminated sites
- select say 3 rows at top
- click at the top 'zoom map to selected features'
- a lot of overlap there
- but from the table can select schools with greatest problems
- and take some measures to help with the situation

related: select by location (say id problematic ones)

- say select polluted sites within 1000 ft from a school
- Vector-Geoprocessing Tools-Fixed Distance Buffer
- Vector-Research Tools-Select by location
- Layer to select from: NJ Contaminated Sites
- Additional layer (intersection layer): Buffer
- Gemetric predicate: within
- and then: NJ contaminated sites-Save As
- check 'Save only selected features'
- and save as csv
- got 80 places we can call and ask to clean up