data

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outline

regular (not gis) data: xls, csv, etc

gis data (has shapes, can make a map from it): shp, kml, etc

the 'join'

Example: New Jersey Home Values

census data [probably do one week later]

old ps comments

communication (forgot to cover last week)

- ◇ email is a preferred mode of communication; just email `gis_int@googlegroups.com`
  - · and everybody in the class
  - · including me and GA will get it
  - · messages will be marked with "[gis_int]" in the subject
- ◇ you can easily filter them to a specific folder, e.g. in gmail:

  `http://support.google.com/mail/bin/answer.py?hl=en&answer=6579`

ps0 comments

- i'll be just emailing comments to each of you individually
- how wass ps0? discuss?
- if you cannot find the right data, just email me

data management takes time! value your time!

- ◇ producing maps is fast
- ◇ most time (i'd say 50-95%) is data management:
  - · figuring out, cleaning, documenting, combining, etc
- ◇ so we start with data management
- ◇ but only about 20% of class is dat mgmt
  - · but it'll be about 80% of your time
- ◇ spend it on data you care about and will use in your career!
- ◇ note: join is difficult! start today/tomorrow on ps, ask Q!

data

- ◇ nj `http://www.nj.gov/dep/gis/listall.html`
- ◇ a lot of data here:
  - · `http://geocommons.com/search.html`
  - · just search for what you are interested in, say 'road'
  - · and see `https://www.policymap.com/maps`
  - · they make you pay to downlad data, but can see source and download by hand

open govt, especially city data

◇ just few examples

◇ trend is that more and more local, state, fed opens up

◇ `http://phlapi.com/` , `https://data.cityofchicago.org/` , `http://opencityapps.org/` , `http://www.opendataphilly.org/` , `http://www.phila.gov/data/Pages/data.aspx`

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old ps comments

what are data?

◇u/a: unit of analysis: what do you study?

◇u/a=# of obs=# of rows=sample size

· dataset has variables, which are the *attributes* of u/as

◇say students: age; counties: water area

◇if several layers: may have several u/as

◇eg counties: #18; hospitals:#700; ex of attr?

◇dataset is a matrix/spreadsheet/2D object

◇cols are vars, rows are obs

◇vars are characteristics of obs

◇eg: edu, age, inc are vars

· and persons are obs–each row is a different person

storage type: numeric v string

- strings are safer; eg string“0821” made into a number results in”821”, which is a mistake !
  - that’s why many software packages, incl qgis often store numbers as strings
  - but then we often need to make them into numeric to do the math or mapping
- be careful about it, triple check, there are often problems and it’s non-intuitive

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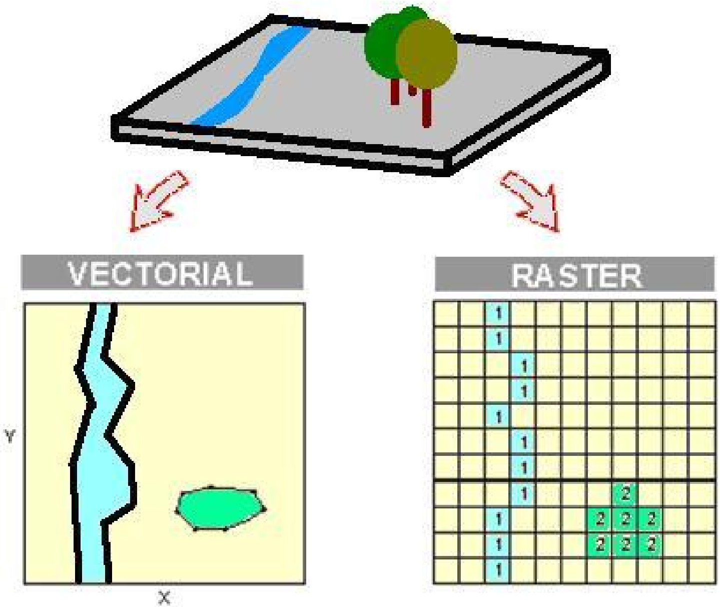
files

- .shp (along with buch of others)
- .kml
- and there’s much more
- we’ll cover them on “as is” basis
- if you bump into something else–let me know–we’ll cover it

raster (picture) and vector (point, line, or polygon)

- raster (has resolution)
  - area covered by cells/pixels
  - each cell/pixel have values/colors
- vector (no resolution): all real world features:
  - points (dots/nodes): airports, cities, trees
  - lines (arcs): rivers, roads
  - polygons (areas): counties, cities

raster and vector



		1								
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		1			2	2	2			
		1								

gis data (has shapes, can make a map from it): shp, kml, etc

gis data as layers of shapes with regular data

- ◇ data are organized by *layers*, eg roads, admin boundaries, etc; show example/draw a picture
- ◇ each layer: location info (shapes)+usually some regular data
  - · ie a data table with location info (shapes) must underlie a map
  - · (and the data table usually contains some regular data, too)
- ◇ often you want to produce thematic (choropleth) maps
  - · thematic maps use different symbols/colors to show variation in regular data

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some real skills

◇ this is where the real value come from:

- to bring different vars together to produce new insight

◇ if you just map vars from same or similar data:

- it has probably already been done!
- just goog: “what you study, map” and see images

◇ but combining creatively variety of vars:

- there is no such map in the world!

◇ eg `https://sites.google.com/site/adamokuliczkozaryn/pubs/rel_inn.pdf`

howto map regular (eg xls) data?

◇ it would likely have geo id:

- ISD name/code, county name/id, etc
- codes/ids are great: unique! (as opposed to names)
- then google a shapefile that you can join with your data

◇ google “geo in you data, shapefile”

- eg “NJ counties, shapefile”

◇ and then join the two to produce a map

◇ beware of representativeness of your data for areas

- i spent months mapping provinces from WVS
- then emailed WVS and was told they’re not representative

“the join problems”: some examples

- ◇ “Camden county” ≠ “Camden”
- ◇ “Congo” ≠ “Congo, Republic of”
- ◇ “Great Britain” ≠ “United Kingdom”
- ◇ “Camden” ≠ “CAMDEN”
- ◇ “Camden ” ≠ “Camden” (space is a character !)
- ◇ “08012” ≠ “8012”
- ◇ be very careful; check the tables to see if it merged right
- ◇ does it make sense? eg Camden richer than Cherry Hill?

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figuring things out

- ◇ so say you've got housing prices for NJ counties
- ◇ then need to google matching gis data (shapefile)
  - · google: "NJ counties shapefile"
- ◇ both have county variable so you can join
- ◇ but both keys/ids need to be coded in exactly the same way
  - · characters and storage!
- ◇ and **you** need to figure this out

http://www.zillow.com/research/data

◇ subset reposted on my website `https://sites.google.com/site/adamokuliczkozaryn/gis_int/NJ-counties-Zillow-Home-Value-Index-TimeSeries.xls`

◇ adjust ID: make counties uppercase

· (or could drop 'County' from COUNTY LABEL variable)

· make col (var) names short: eg <5 alphanumeric chars

◇ and clean up: dropped first row, excessive columns,$ (%,#, etc) and ","; cnty names upcase, saved as csv (first sheet)

◇ `https://sites.google.com/site/adamokuliczkozaryn/gis_int/all_homes.csv`

· note missing val for Morris; think abt missing data!

◇ nj counties data (same as alaways)

`https://docs.google.com/uc?id=1xJDhcRCkgv7k4tNCa72Oog5bohV6dTB2&export=download`

excel note!!

- ◇ excel is clunky, and often adds special/weird characters!
- ◇ when save as csv, go to:
- ◇ tools-web options-encoding and select 'us ascii'
- · other ideas: `https://www.webtoffee.com/how-to-save-csv-excel-file-as-utf-8-encoded`

install MMQGIS (just once) if not there already

- ◇ Plugins-Manage and Install Plugins:
  - · Search: MMQGIS
  - · and install
- ◇ now we can use MMQGIS to join and fix the data!
  - · [another way to do joins:

    `http://www.qgistutorials.com/en/docs/performing_table_joins.html`]

MMQGIS: join; and text to float

- MMQGIS-Combine-Attributes Join From CSV File
- Input CSV: all_homes.csv
- CSV File Field: UPPER
- Join Layer: nj_counties
- Join Layer Attribute: COUNTY
- make sure notfound.csv is where you want it
- check notfound.csv: header and 'NEW JERSEY': makes sense!
  - check the tables to see if it joined right; be very careful!
- MMQGIS-Modify-Text to Float (almost always need this!)
- highlight "Dec 2012" only (others are not clean:"$",",")

missing value

◇ right click layer-Open Attribute Table

◇ note that now MORRIS has 0 for “Dec 2012”

◇ this is incorrect!

◇ hit pen icon at top left: “Toggle Editing Mode”

· and remove zero from that cell

◇ hit “Toggle Editing Mode” again and Save

and the thematic map

- ◇ nj_counties-Properties-Style and from drop-down: “Graduated”
- ◇ Column: “Dec 2012”
- ◇ Color ramp: i like Blues!
- ◇ many ways to classify [if time, discuss later]
- ◇ usually good: 'natural breaks/jenks' say 3-7
- ◇ and hit “Classify” button
- ◇ and hit “OK” to see the map–viola!
- ◇ zoom in as much as needed

printing to file: Project-New Print Layout

◇ left: blank icon “Add New Map” and draw a rectangle

◇ NJ is tall: on the right “Layout”and do “Resize layout”

◇ left: icon with arrows “Move Item Content” to adjust view

◇ right: “Item properties” change scale to adjust zoom and/or use mouse’s wheel

◇ left: legend button “Add new legend” (legend needs fixing)

· right: **uncheck** auto-update and beautify it:

· drop items with minus sign; and edit by double clicking it

◇ top: on the left: Layout-Export as Image

· probably png is fine, just increase resolution to say 600dpi

- `http://www.qgistutorials.com/en/docs/making_a_map.html` and

- `http://docs.qgis.org/2.0/en/docs/user_manual/print_composer/print_composer.html`

don’t trust anybody!

- ◇ remember, always be critical
- ◇ triangulate your results: compare with other source
  - · just goog picture, eg ’nj counties property values map’
- ◇ looks about right
  - · (other definition of the prices, but correlation is important)
- ◇ show to others, ask for comments
  - · present locally or at a conference
- ◇ i mistakengly thought a lot of alcohol problems in Cape May
  - · but it is just tourists!

tip1

- merging (joining) data is tedious and tricky
- be careful, double, triple check
- easy to make mistake

tip2: missing vals

- ◇ tricky! pay extra attention to it!
- ◇ sometimes qgis makes ' ' to 0! esp MMQGIS: str to float
- ◇ sometimes qgis colors it yellow sometimes transparent:
  - · (i guess: ' '=transparent, 'NULL'=yellow)
- ◇ to make it stand out can change color ramp
  - · eg if NULL is white, make even number of classes say 2
  - · and say make color ramp GnRd

tip3: what if traditional data is in weird format

◇ same as with gis data

- if you see something else than .shp or .kml, email us!
- there are many data formats, and we cannot cover them all
- we'll do them if we bump into them–do let us know what you've found!

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census data: 5-yr ACS

◇census is a good source of data, even at neighborhood level!

◇for city/neighb lev probably want 5-yr ACS

◇`https://geomap.ffiec.gov/FFIECGeocMap/GeocodeMap1.aspx`

◇`https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t`

◇can search in top box but probably best select on the left from "Topics" eg: people-poverty-poverty

◇then select "Geographies": eg census tracts (ie neighborhoods)

· go down to "All Census Tracts in Camden County" and hit "ADD TO YOUR SELECTIONS" and hit "CLOSE"

◇and from "Show results from" pick "2015"

· click "S1701, POVERTY STATUS IN THE PAST 12

cont

- take note of margins of errors!!
  - most precise is decennial census, but much fewer variables
- "Modify Table" and keep selected only the stuff you need
- ok, at top hit Download
  - and check "Use" not "View"
  - keep both checked: "Merge the annotations..." and "Include descriptive...", hit OK
  - csv reposted `https://docs.google.com/uc?id=1MD-P2Iu0XWWkYAsIn0WCYfqZ15cJya8n&export=download`

again, always clean it up before getting into qgis

- open csv file, keep GEO ids (will use them for join)
  - and just keep only needed vars and rename them:
  - HC01_EST_VC01, Total; Estimate; Population for whom poverty status is determined: “tot”
  - HC01_EST_VC53 Total; Estimate; ALL INDIVIDUALS WITH INCOME BELOW THE FOLLOWING POVERTY RATIOS - 125 percent of poverty level: “pov125”
- then calculate ratio of pov to tot: “prop”
- and drop row 2, the long name
  - and save as csv
  - clean csv reposted: `https://docs.google.com/uc?id=1Hw-3nugfIpSvvyai7Jy-lwA2IsRA0Pz0&export=download`

get geo data

- census has geo data for any US geog!: `https://www.census.gov/geo/maps-data/data/tiger-line.html`
- tracts: `https://www.census.gov/geo/maps-data/data/cbf/cbf_tracts.html`
  - doing 2015 because we have 2011-2015 data
- then note there are 2 similar IDs that would match census csv
  - shp: `https://docs.google.com/uc?id=1KNe_DSJQxiUiMVzKdVfHzYjUZSke2OnY&export=download`

join!

- load shp and then
- MMQGIS-Combine-Attributes join from CSV file
- MMQGIS: csv GEOid, shp: AFFGEOID
- and check notfound.csv–should be none
- MMQGIS: modify: text to float: tot pov125 prop
  - (Ctrl and left click all three)
- right click layer-Properties-Style: “Graduated” map prop with say Blues 5 jenks
- move around and say zoom in on Camden

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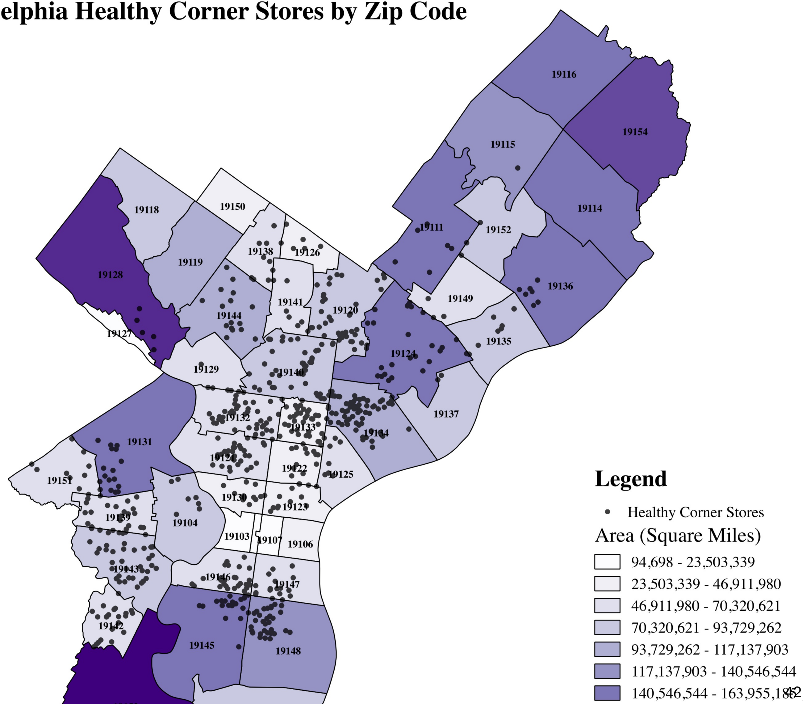
general comments

- please no ms word! txt or pdf
- remember to specify u/a and num of obs
- need to email me *all* data you've used
  - (incl data you used for joining (toady's class))
  - eg do not assume i have NJ counties
- send the whole thing! can just zip the whole project folder
  - or share good drive, dropbox.com etc
  - .shp file won't work! (need .dbf .prj, etc)
- again, in journal you can ask me questions!

Philadelphia Healthy Corner Stores by Zip Code



healthy corner stores

◇ makes sense to label zipcodes; right proportions

◇ these aren't sq miles! sq ft or meters!

· colors denote polygon sizes–so same info twice

· better could map educ, inc, age, bmi, etc

· dots could be little smaller or hollow so they overlap less

◇ make goog map and zoom in: show more detail

see environ: other businesses, pub transpo, sch, etc

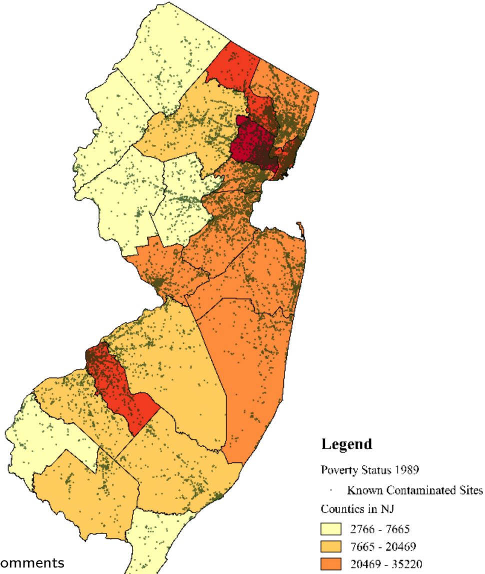
◇ wonder about big healthy stores like wholefoods

· could dentote big ones with big dots

◇ usually may want to put year on a map

· (at very least in metadata/journal)

Contaminations Sites in New Jersey 1992



contaminations

- ◇perfect size and color for contaminated sites!
  - ·doesn't overlap much but big enough to see
  - ·and grayish good for contamination
- ◇informative– NYC and Philly the worst
- ◇excellent idea to relate poverty to contamination
  - ·there is lit linking them! so nice test! [also can do race]
  - ·could do poverty at municipal or census tract levels
- ◇use space better! NJ should be bigger like Philly stores map
- ◇thousands must be set off by commas in legend
- ◇very good to match contaminations and poverty by year!
- ◇ "poverty status"–guess counts; better %
- ◇as in Philly map: zoom to Camden, have goog map in back

contaminations

◇http://www.nytimes.com/interactive/2015/07/08/us/census-race-map.html?_r=0

◇in couple classes we'll be making online maps like this

◇but already now you can do sth similar

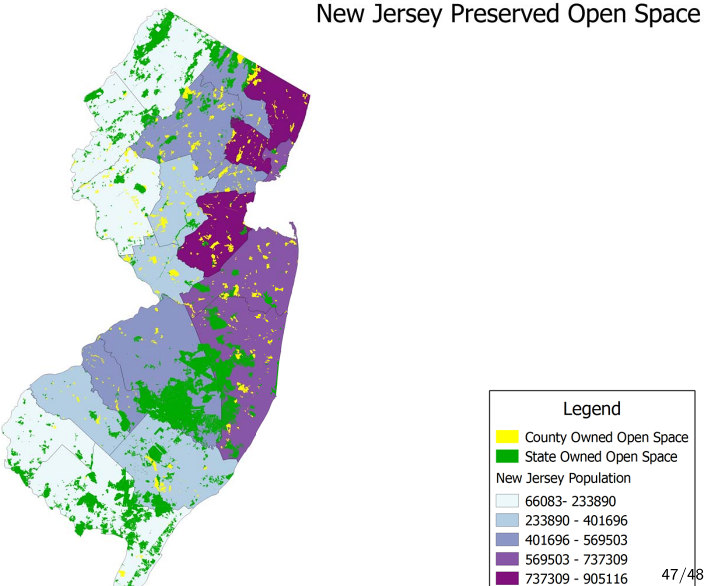
- see footnote: census and socialexplorer.com: download data

◇map in qgis and bring in background from googmaps

- with openlayers plugin

open space

◇


New Jersey Preserved Open Space
Legend
🟨 County Owned Open Space
🟩 State Owned Open Space
New Jersey Population
□ 66083- 233890
▨ 233890 - 401696
▨ 401696 - 569503
▨ 569503 - 737309
■ 737309 - 905116

open space

- ◇ excellent idea for map–open space related to population
- ◇ great use of multiple layers
- ◇ great non-cluttered borders
- ◇ can use space better-portrait orientation, bigger NJ
- ◇ use commas for population
- ◇ say for which year it is
- ◇ pop den probably more meaningful
  - · on the other hand, we already see size from map
  - · and so we can sort out density