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

data management takes time! value your time!

⋄producing maps is fast; data management is 50-95% of time

·figuring out, cleaning, documenting, combining, etc

⋄so we start with data management: only 2 classes

·but critically important and time consuming for you

⋄spend it on data you care about and will use in your career!

⋄think hard about data you'll use in your career

⋄otherwhise you'll waste 100+ hours !!!

gis data

⬦ camden county https://camdencountynj-ccdpw.opendata.arcgis.com/search?collection=Dataset eg camden zoning :)
   https://camdencountynj-ccdpw.opendata.arcgis.com/datasets/camden-city-zoning

⬦ NJ https://gisdata-njdep.opendata.arcgis.com

⬦ Philly https://www.opendataphilly.org

⬦ a lot:

· http://geocommons.com/search.html

· just search for what you are interested in, say 'road'

⬦ https://www.policymap.com/maps

· they make you pay to downlad data, but can see source and download by hand

⬦ open gov, especially city data, just few examples

⬦ 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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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

$\diamond$ .shp (along with buch of others)

$\diamond$ .kml

$\diamond$ and there's much more

$\diamond$ 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
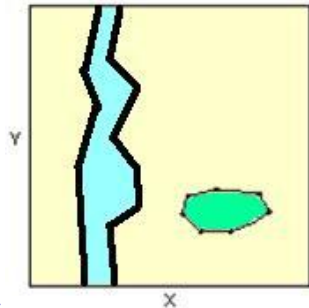
· each cell/pixel have values/colors

◇ vector (no resolution): all real world features:

· points (dots/nodes): airports, cities, trees

· lines (arcs): rivers, roads

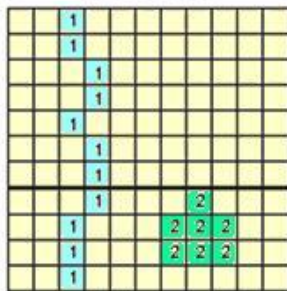· polygons (areas): counties, cities

raster and vector

VECTORIAL

RASTER

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 <u>geo id</u>:

· 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" $\neq$ "Camden"

◇ "Congo" $\neq$ "Congo, Republic of"

◇ "Great Britain" $\neq$ "United Kingdom"

◇ "Camden" $\neq$ "CAMDEN"

◇ "Camden " $\neq$ "Camden" (space is a character !)

◇ "08012" $\neq$ "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 fix! [do this if trouble reading csv into qgis]

⋄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

$\diamond$ Plugins-Manage and Install Plugins:

$\cdot$ Search: MMQGIS

$\cdot$ and install

$\diamond$ now we can use MMQGIS to join and fix the data!

$\cdot$ [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 joined output shapefile is where you can write!

· 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

print layout

◇ people always have toroubles

◇ so let's do it again!

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!

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"

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=

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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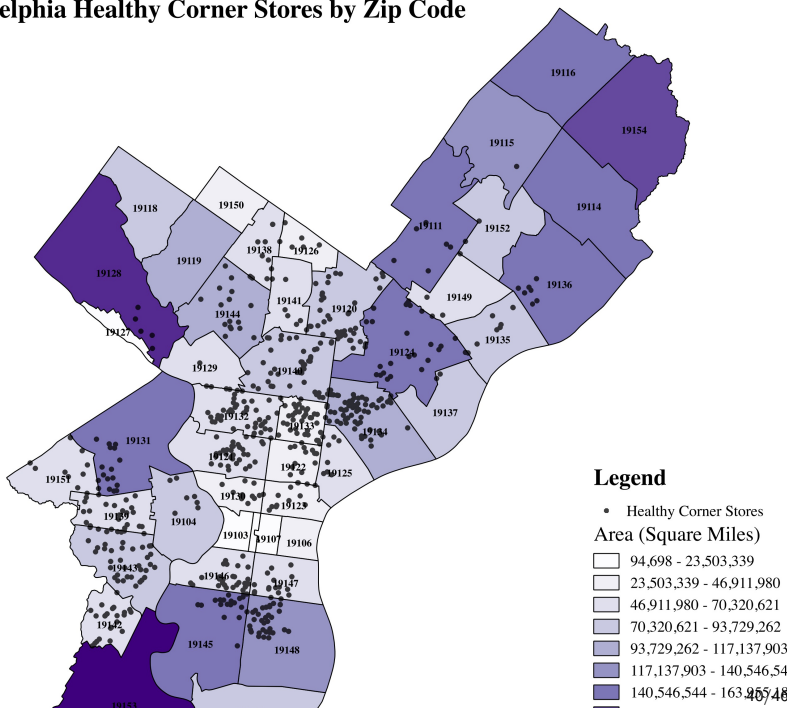the 'join'

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old ps comments

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)
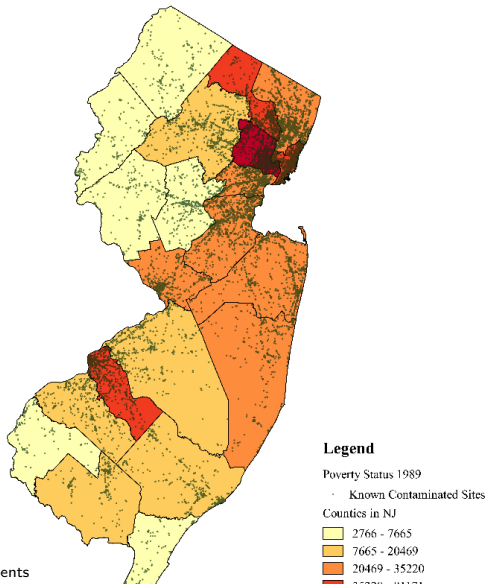
◇ again, in journal you can ask me questions!

Philadelphia Healthy Corner Stores by Zip Code

Legend

• Healthy Corner Stores

Area (Square Miles)

	94,698 - 23,503,339
	23,503,339 - 46,911,980
	46,911,980 - 70,320,621
	70,320,621 - 93,729,262
	93,729,262 - 117,137,903
	117,137,903 - 140,546,54
	140,546,544 - 163,9548

old ps comments

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

Legend

Poverty Status 1989

·   Known Contaminated Sites

Counties in NJ

	2766 - 7665
	7665 - 20469
	20469 - 35220
	35220 - 41471

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 %

old as again in Philly map: zoom to Camden, have goog map in

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

New Jersey Preserved Open Spa
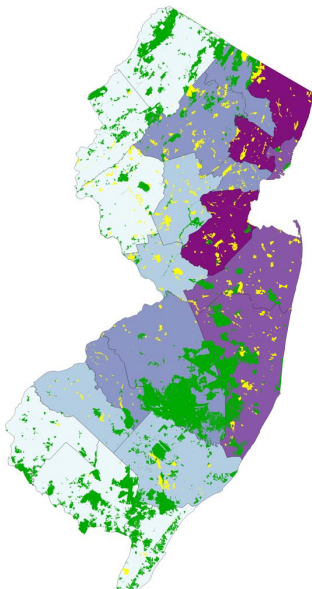
Legend

County Owned Open Sp
State Owned Open Spac

New Jersey Population

66083- 233890
233890 - 401696
401696 - 569503
569503 - 737309
737309 - 905110

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