

Intro to GIS

What is GIS?

GIS stands for Geographic Information System and is a way to analyze and explore spatial relationships and data. Geographic data can tell different stories depending on what information you do or do not include, and maps create a lot of authority for those stories!

The abilities of GIS are almost limitless: anything you can imagine involving spatial data, using a whole set of open datasets as well as those that Harvard has purchased access to (and MIT!). Here's a link to [MIT's GIS center](#) -- they have a special/fancy library for this that is worth visiting, and here's [Harvard's](#), and our [datasets](#).

ArcGIS vs QGIS

ArcGIS is paid, and Harvard gives us access, but it is only for PCs -- sad! QGIS is open source and works on all operating systems. The difference between the two is marginal, and probably won't matter for most of what you do (but is worth looking into). We'll use QGIS.

Downloading Data

We'll work with some census data today. Download the borders from [TIGER/Line \(2017\)](#).

Download Block Groups (smallest unit of analysis).

We'll download Census data using [American FactFinder](#) for population. Detailed tutorial [here](#), but I'll cover the highlights.

- The census data is formatted badly.
 - Change variable names to remove periods
 - Change field type to numeric for all! .xlsx is fine.
 - This is very frustrating!
 - Note: ArcGIS is mildly pickier.

The Earth is a Sphere

But your computer screen is flat. So we need to think about how to project our data on a flat surface (like flattening an orange peel!).

- Difference between projection systems
- Choosing one (NAD83: Mass Mainland for us)

Merging in Layers

First, put in the MBTA information I collected:

- Try putting on labels for the T stops!
- More MBTA data is [here](#).

We'll cover:

- Attribute tables
- Joins
- Layers

Spatial Analysis

Graduated map:

- What kind of classification system?
 - Jenks/Natural/Specific
 - What kinds of effects do we want to show?
- Colors/gradients

Create Buffers along each of the transit stops

- How would we count the number of people within each?
- Spatial selection!

Bonus

Merge in another dataset and see how it compares! I've put in a few interesting datasets you might want to look at in the bonus_data folder. Some ideas:

- How do crime and income levels correlate?
- How do transit stop accessibility and income levels correlate?