Fundamentals of GIS Lecture & Workshop 4

Vector-Relational Tools and Categorical Mapping

1. Discuss questions about [Projections](#) and [Nuts and Bolts of Mapping](#) exercise.
a. Layers and .LYR files carry many useful data-display properties beyond the graphic symbology. In class we will look at the fancy label styling of the MassDOT roads layer. This wil be a good intro to Structured Query Language or SQL.

2. **Term Project Topics**. Has everybody started your term project Research Review? You should have at least read the Research Review and the Term Poster instructions in the Term Project Installments folder? Any questions?

3. **Segue: Referencing Systems, Transformations and Associations are at the heart of [data models](#).** The heart of using data in decision-making is trying to understand how things and conditions are related to other things and conditions. To do this, you first have to understand referencing systems. Last week it was geospatial referencing systems – which allow us to understand the geo-spatial associations or distinctions among observations.   This week we look at Categorical Referencing Systems and the tools for using these to discover relationships and to portray data in meaningful ways.

4. [Optional Reading: Data Formats and Interoperability](#) Ways that we encode and exchange references. Read this if you are interested in knowing more about Shapefiles, Geodatabase Feature Classes and DBF files.

5. First, we need to understand some essential tools and conventions for encoding references as data that we can exchange and manipulate in predictable ways. We will focus on an important convention that humans have established for encoding observations as rows in tables and for using these tables to explore and simulate the associations and distinctions among things and conditions that have been observed or conjectured. This tabular mechanism is known as [Relational Database Management Systems](#) (RDBMS).

Talking about Simple and Complex Categorical Referencing Systems

You may recall the Grade attribute on the MBTA Rapid Transit Lines shape file uses a categorical referencing system to represent different conditions of the transit tracks being above or below ground.


```
GRADE       Grade status as follows:
            1 = Above Ground, Private ROW
            2 = Light Rail with Reservation in Street
            3 = Light Rail/Bus in Street with Traffic or Tunnel
            4 = Elevated
            6 = Open Cut
            7 = Underground Subway
```

In our second workshop we used the references to Grade Classes to color the lines according to these values. We also used the legend editor to color the transit lines according to this condition. We also used the legend editor to re-group the lines into more general categories, Subway, Rail Above Ground, and Other.

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Agriculturally relevant categorical referencing systems?

- **USDA Soil Classifications (see page 149)**,   Also see the Web Soil Survey Application
- USDA Agricultural Commodities Categories (ag Census) . Also see CropScape
- **Massachusetts Department of Revenue Land Use Classification**
- **US Department of Commerce Standard Industrial Class Codes,**

6. Demo: Structured Query Language using the 1999 MassGIS Land Use Dataset as a model of land use and land use change.

Break

7. Elements of Cartographic Style, Part 2: Thematic Maps with Categorical Data.
8. Lab: Mapping and Transforming Categorical Referencing Systems