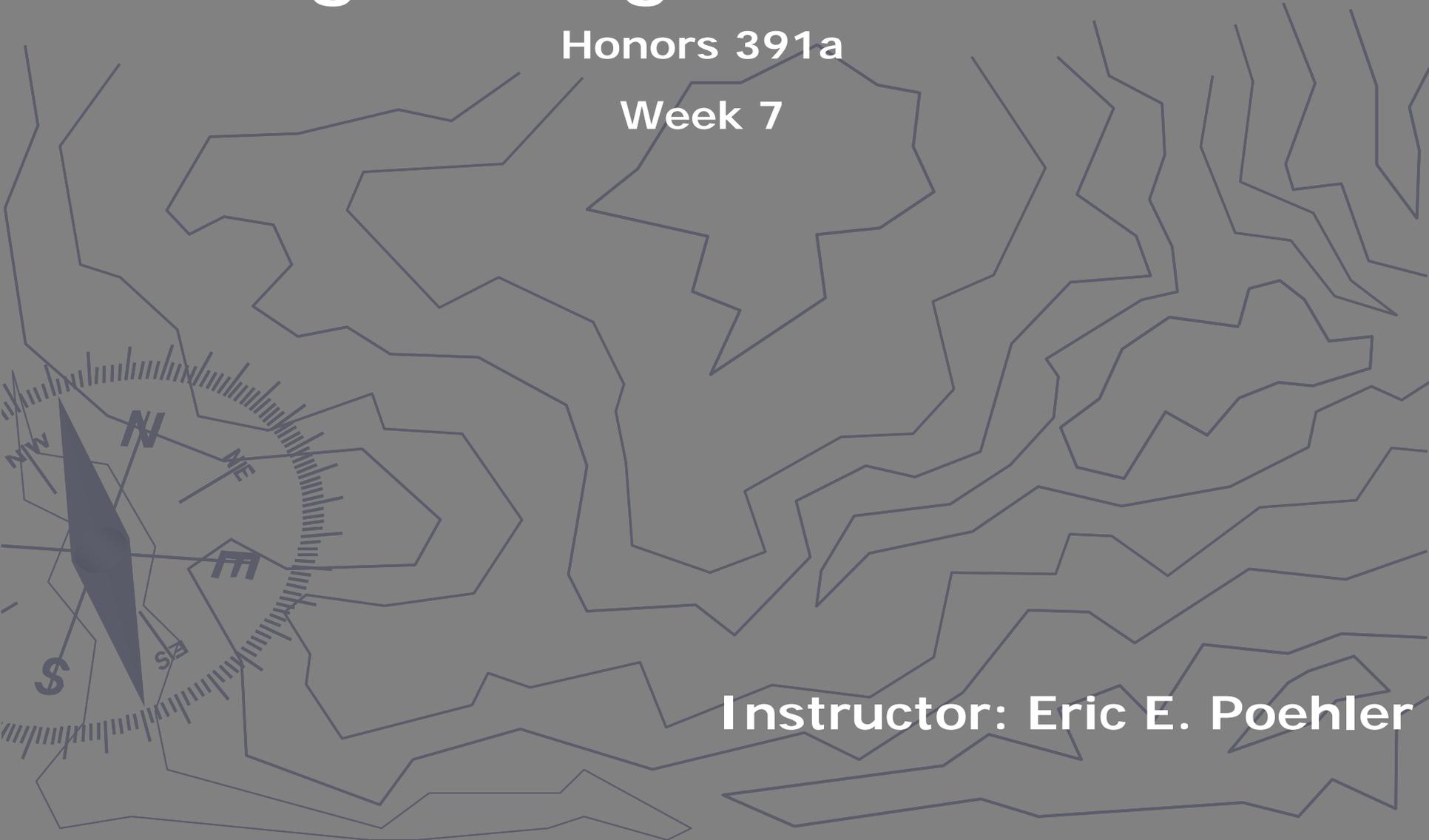


Doing the Digital Humanities

Honors 391a

Week 7

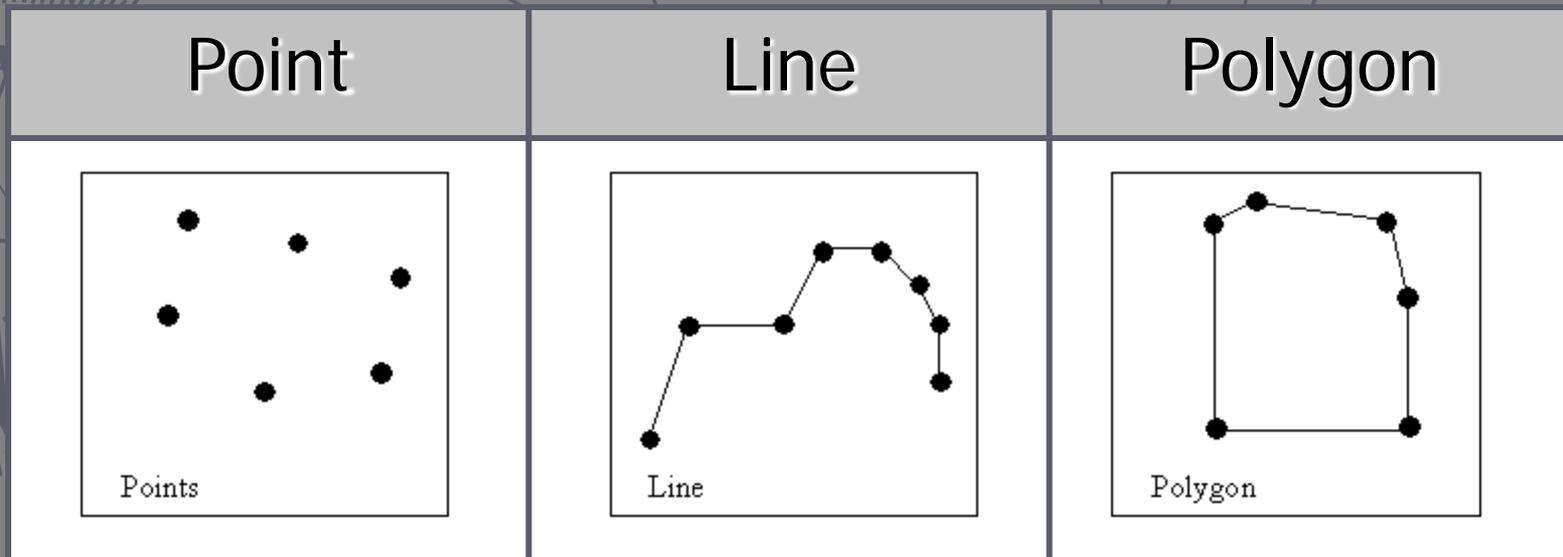


Instructor: Eric E. Poehler

What is a GIS?

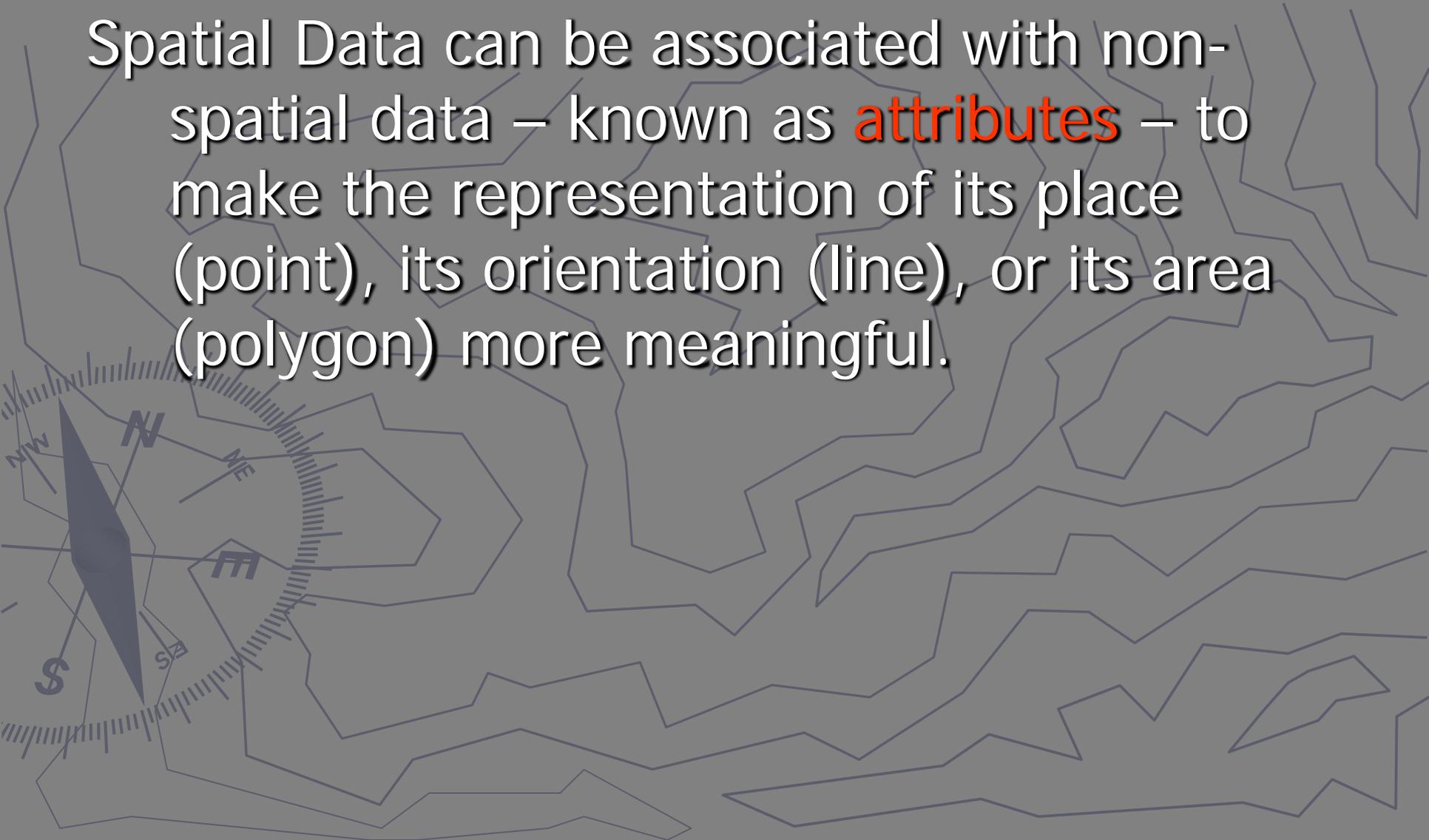
The key element of a GIS over a database is that "A GIS is a computer system capable of assembling, storing, manipulating, analyzing and displaying **geographically referenced information, i.e. data identified according to their locations**"

That location can be defined by three main representations:

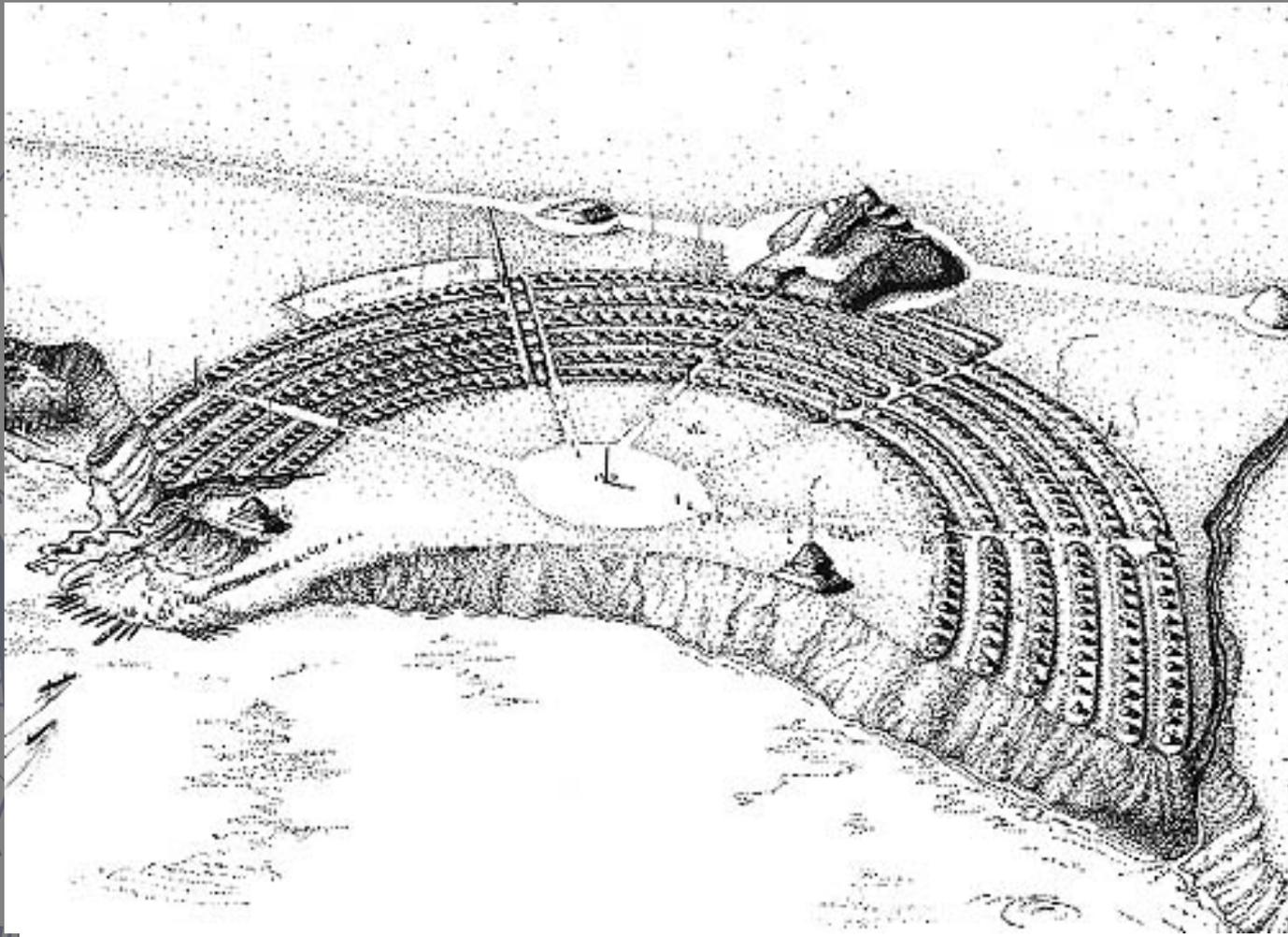


What is a GIS?

Spatial Data can be associated with non-spatial data – known as **attributes** – to make the representation of its place (point), its orientation (line), or its area (polygon) more meaningful.



What is a GIS?



Points:

Locations of coring, associated with the data from each.

Lines: Contour lines representing changes in elevation by position.

Polygons: Surface area taken up by mound area, representing change in elevation by color

Locations of Geological Coring at Poverty Point, LA

What is a GIS?

Main Features:

1. Capturing Data:

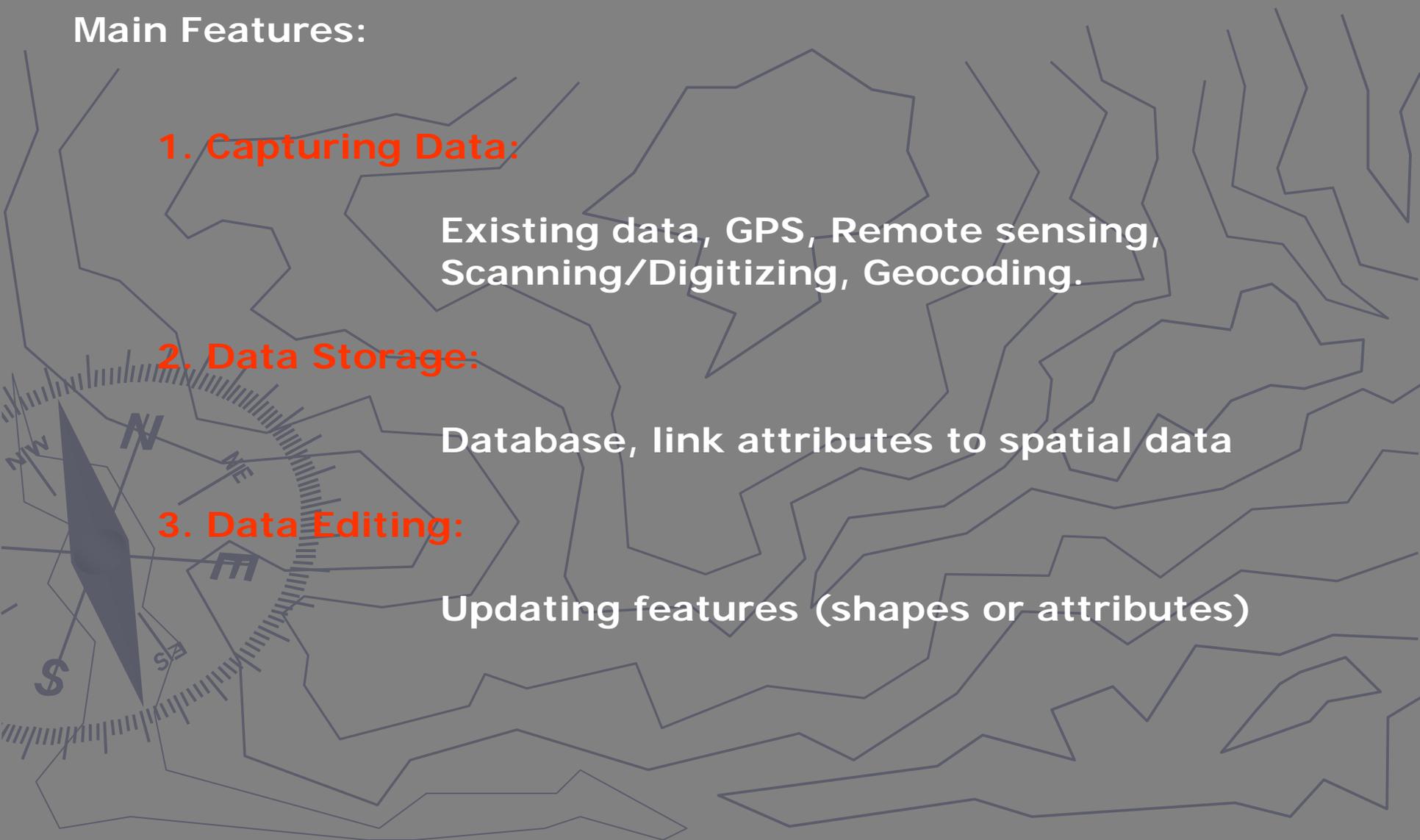
Existing data, GPS, Remote sensing, Scanning/Digitizing, Geocoding.

2. Data Storage:

Database, link attributes to spatial data

3. Data Editing:

Updating features (shapes or attributes)



What is a GIS?

Main Features:

4. GIS Analysis:

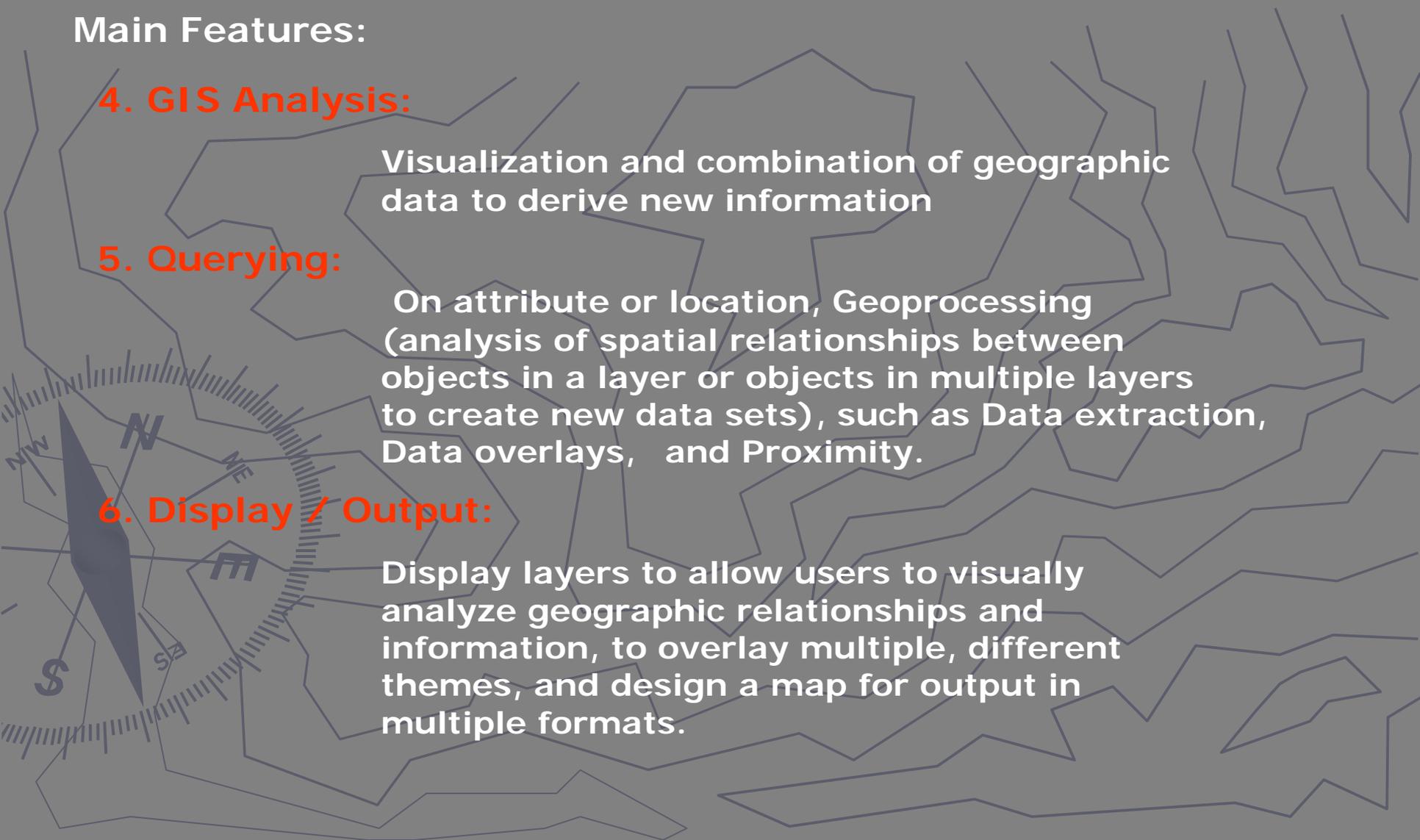
Visualization and combination of geographic data to derive new information

5. Querying:

On attribute or location, Geoprocessing (analysis of spatial relationships between objects in a layer or objects in multiple layers to create new data sets), such as Data extraction, Data overlays, and Proximity.

6. Display / Output:

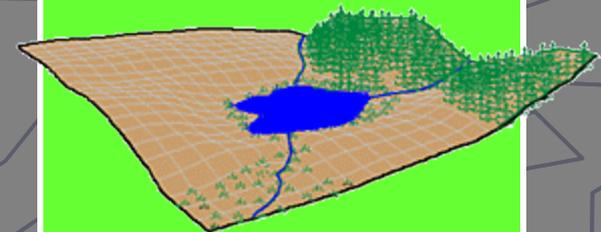
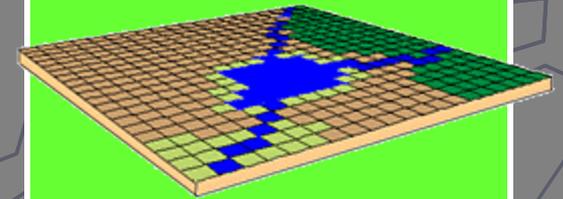
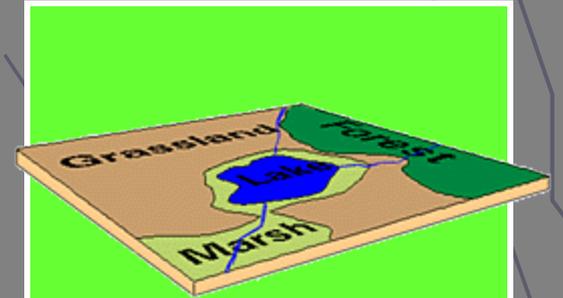
Display layers to allow users to visually analyze geographic relationships and information, to overlay multiple, different themes, and design a map for output in multiple formats.



GIS Data: 2 Models

Vector: "An abstraction of the real world where positional data is represented in the form of co-ordinates. In **vector data**, the basic units of spatial information are points, lines and polygons. "

Raster: "An abstraction of the real world where spatial data is expressed as a matrix of cells or pixels, with spatial position implicit in the ordering of the pixels ."



Real World

GIS Data: 3 Data Types

Map data. Map data contains the location and shape of geographic features. Maps use three basic shapes to present real-world features: points, lines, and areas (polygons).

Attribute data. Attribute (tabular) data is the descriptive data that GIS links to map features. Attribute data is collected and compiled for specific areas like states, census tracts, cities, and so on and often comes packaged with map data. When implementing a GIS, the most common sources of attribute data are your own organization's databases combined with data sets you buy or acquire from other sources to fill in gaps.

Image data. Image data ranges from satellite images and aerial photographs to scanned maps (maps that have been converted from printed to digital format).

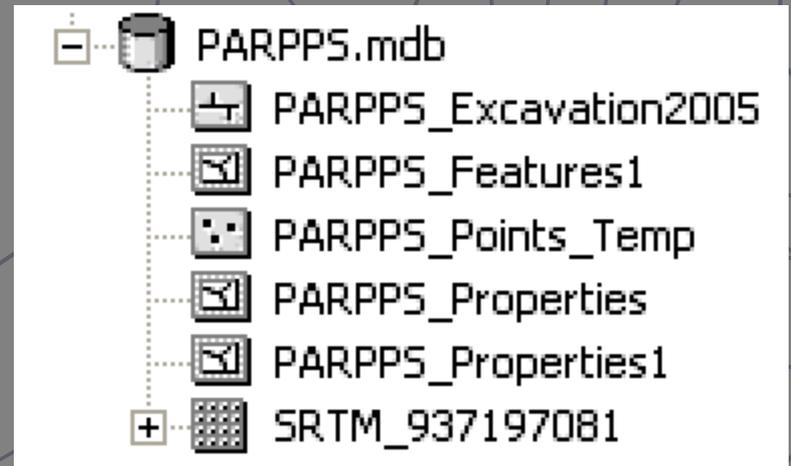
GIS Data: Data File Types

Feature Class (Vector): A collection of geographic features with the same geometry type (such as point, line, or polygon), the same attributes, and the same spatial reference. Feature classes can be stored in **geodatabases**, **shapefiles**, **coverages**, or other data formats. Feature classes allow homogeneous features to be grouped into a single unit for data storage purposes.

Name	Type
 PARPPS_Points_Temp	Personal Geodatabase Feature Class
 PARPPS_Excavation2005	Personal Geodatabase Feature Class
 PARPPS_Features1	Personal Geodatabase Feature Class

GIS Data: Data File Types

Geodatabase: A database or file structure used primarily to store, query, and manipulate spatial data. Geodatabases store geometry, a spatial reference system, attributes, and behavioral rules for data. Various types of geographic datasets can be collected within a geodatabase, including feature classes, attribute tables, raster datasets, network datasets, topologies, and many others



GIS Data: Data File Types

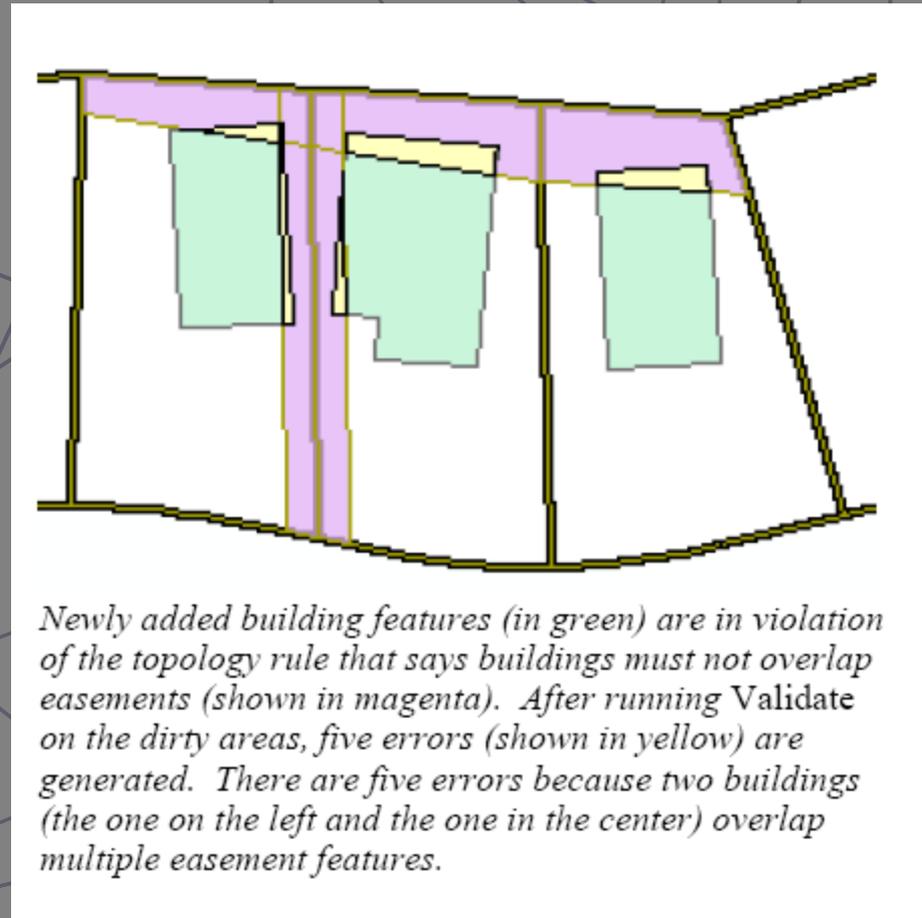
Shapefile: A vector data storage format for storing the location, shape, and attributes of geographic features. A shapefile is stored in a set of related files and contains one feature class. This format lacks the capacity to store **topological information** which differentiates it from a Feature Class.



GIS Data: Data File Types

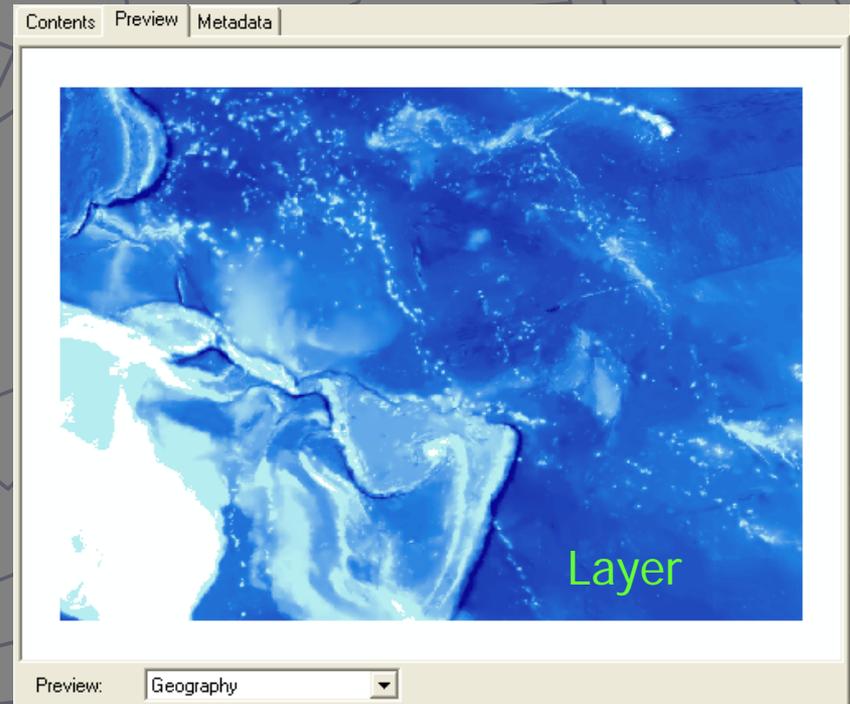
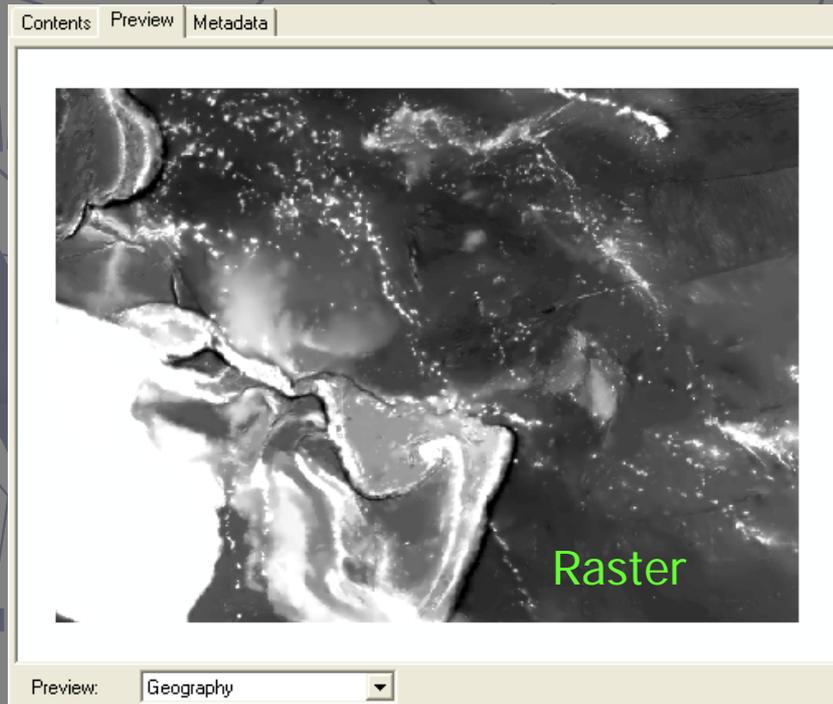
So... What is Topological Information?

In geodatabases, topological information is the arrangement that constrains how point, line, and polygon features share geometry. For example, street centerlines and census blocks share geometry, and adjacent soil polygons share geometry. Topology defines and enforces data integrity rules (for example, there should be no gaps between polygons). It supports topological relationship queries and navigation (for example, navigating feature adjacency or connectivity), supports sophisticated editing tools, and allows feature construction from unstructured geometry (for example, constructing polygons from lines).



GIS Data: Data File Types

Layer: A reference to a data source, such as a shapefile, coverage, geodatabase feature class, or **raster**, that defines **how the data should be symbolized on a map**. Layers can also define additional properties, such as which features from the data source are included. Layers can be stored in map documents (.mxd) or saved individually as layer files (.lyr).



GIS Data: Data File Types

Annotation: In ArcGIS, text or graphics that can be individually selected, positioned, and modified. Annotation may be manually entered or generated from labels. Annotation can be stored as features in a geodatabase or as map annotation in a data frame.

