

GEOL 452/552

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GIS for Geoscientists I

Lecture 3 - Chapter I

1

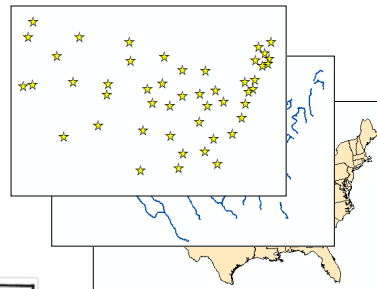
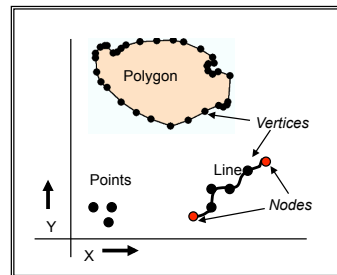
Today:

- GIS vector data - review
- raster data
- history: ArcView/ArcINFO - ArcGIS
- types of GIS data files
- Lab: finish Ch. I tutorial and HWI
- Please again copy the geol552\data\mgisdata5 into you student folder before you start the tutorial or HW

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GIS vector Data (review)

- a **feature**: point, a line or a polygon (vector data)
- collection of features of the **same geometry** (e.g. all points): layer or **feature class**
- each feature stores coordinates and other attributes in a **table**



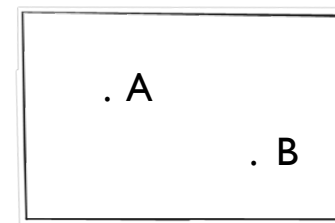
ID	x/y Location	Name	Pop2007
1	213232.5 / 34243.6	A	1200
2	276343.5 / 32930.5	B	34200

3

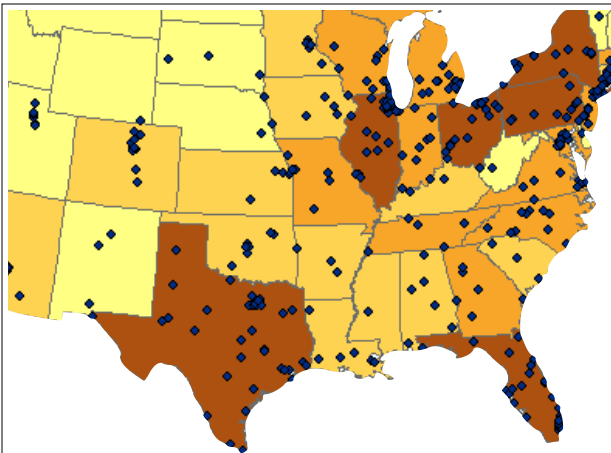
Let's annotate this layer (draw on paper)

- Which are **attributes (or fields)** ?
- Which are **features**?
- Which are **records** in a table?
- How do table rows relate to the GIS map?

ID	x/y Location	Name	Pop2007
1	213232.5/ 34243.6	A	1200
2	276343.5/ 32930.5	B	34200



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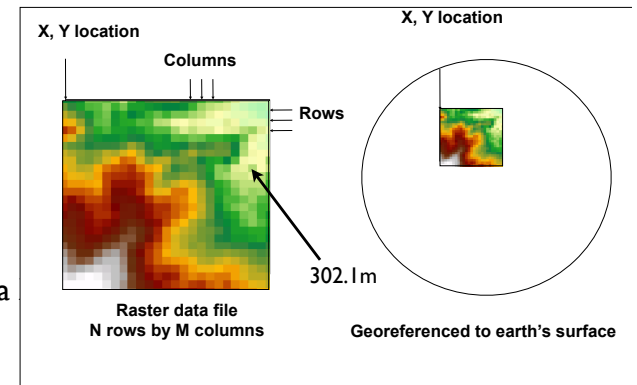


- Map of 30 states, (polygons) 500 cities (points) - how many total features, tables, records?
 - # of feature classes (layers) ? _____
 - # of features ? _____
 - # of attribute fields ? _____
 - # of total records ? _____

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Raster data

- collection of points (pixels, cells) as a 2D matrix
- Each cell (center) has a location on Earth
- size: rows x columns
- Data “table”: each cell contains (one or more) numbers
- Elevation => Digital Elevation Model (DEM)
- Image: Air/Satellite photo
- Geol552: mainly vector data, raster data only in chapter 8



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a Bit of history: ArcInfo vs. ArcView vs. ArcGIS

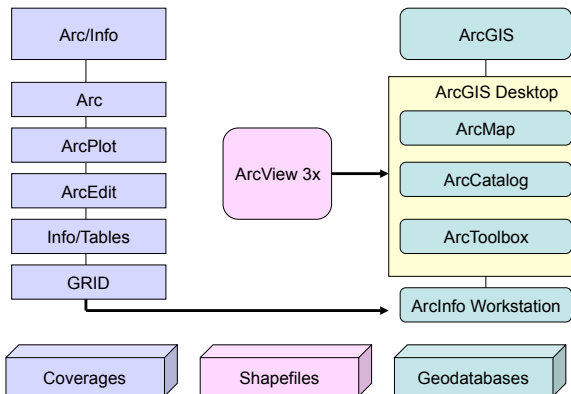
Historic development of ESRI's GIS System:

ArcINFO (DB format, originally UNIX)

ArcView (Map making)

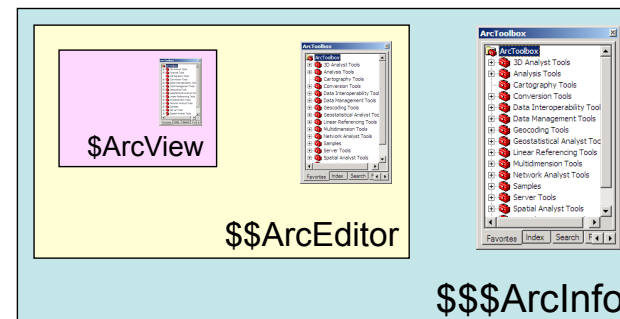
ArcGIS **Desktop** (Unified approach)

- **ArcMap**: visualization & analysis application
- **ArcCatalog**: Data browser (inside ArcMap)
- **ArcToolbox**: tools for conversion, projection, analysis, etc.



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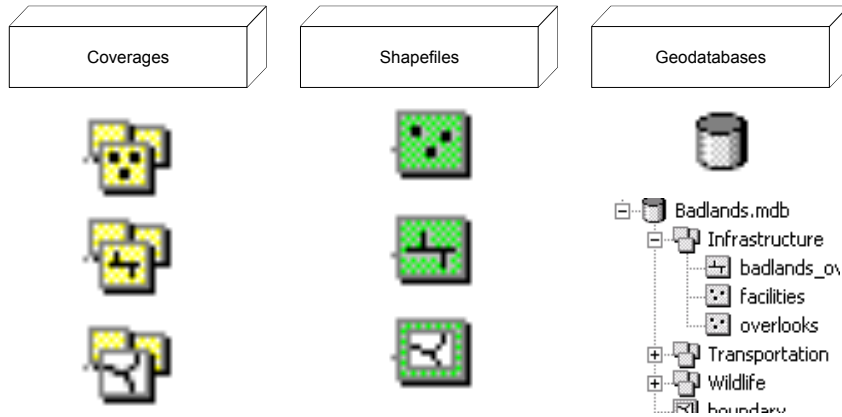
- What is Arc-View or Arc-Info functionality in ArcGIS 10 ?
- This functionality level has nothing to do with the old ArcView/Arc-Info software:
- ESRI sell ArcGIS in 3 different versions of complexity
- (think: light - advanced - professional)
- ISU GIS lab: ArgGIS - **ArcInfo** functionality



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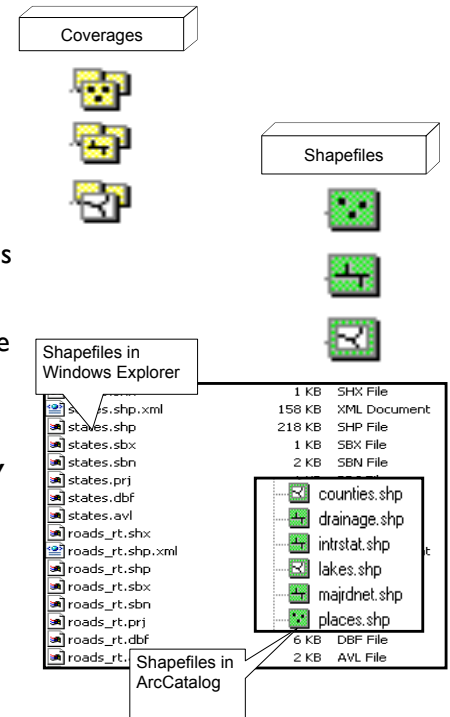
Arc GIS Data formats

- 3 types of vector data files



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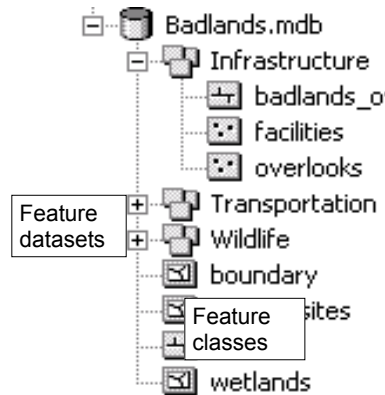
- Coverages (beige): older format - skip for now
- **Shapefiles** (green): vector files
 - each file contains only 1 feature class (many features of **same** type)
 - in ArcCatalog: **looks** like a single file
 - in Windows: many different files for each “single” shape file
 - => always use ArcCatalog to **copy/move/delete** shape files!
 - attribute table is a .dbf file (dBase format, MS Excel 2003 to write)



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- **Geo data base** GeoDB (file or personal): grey
- *feature dataset* (= collection of feature classes)
- feature class (many features, same as a shape file)
 - feature (single point, line, ...)

- .gdb or .mdb
- Use file geODBs (.gbd)
- need Arc to look inside
- keep track of a feature’s length/area
- Can also store tables, rasters, topology, networks



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layer files (.lyr)

- Yellow “stack” icon
- .lyr files store only the **appearance** (line thickness, symbol type, color of features, etc.)
- They don’t contain any actual spatial data - only a how to **draw** data stored somewhere else!
- Layer group - “folder” with .lyr files inside
- Confusion alert: don’t mix up with the GIS layer- (feature class) concept

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Name	Type
yellowstone	Personal Geodatabase
states	Coverage
vegetation	Coverage
boundary	Shapefile
dem30	Raster Dataset
elevation	Layer
hillshade	Raster Dataset
hydrology	Layer
mask	Shapefile
study_area	Shapefile
tin_study	TIN Dataset
vegtype	dBASE File
yellowstone	Map Document

Austin
Administrative
Environmental
Facilities
Parks
Transportation
airports
arteries
railroads
streets
petition
restaurants
Crestview
AUSTIN_EAST-NWD1
dog_offleash_areas
dog_offleash_bnds
edwardsoverview

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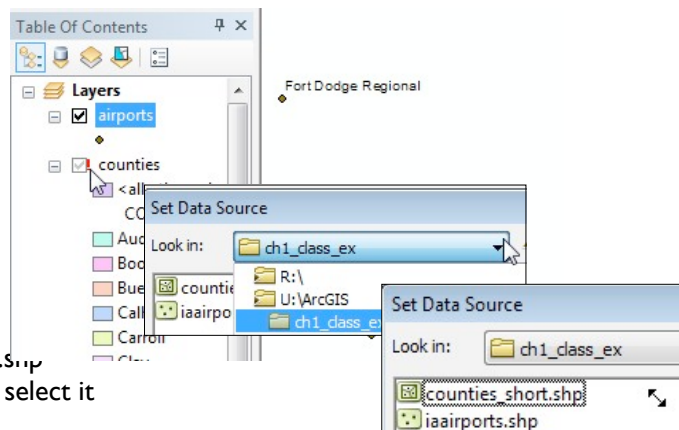
ArcMap document file (.mxd)

- Does NOT directly contain any data
- contains only **links** to data files (links may be bad: !)
- (deleting a mxd file does not delete its data)
- map document files store “**appearances**” only:
 - symbol type, color of features, etc. per layer
 - (think: many .lyr files)
 - layout (printing), more
- If you remember only one thing about today’s lecture : **mxd files do NOT contain any real data!**

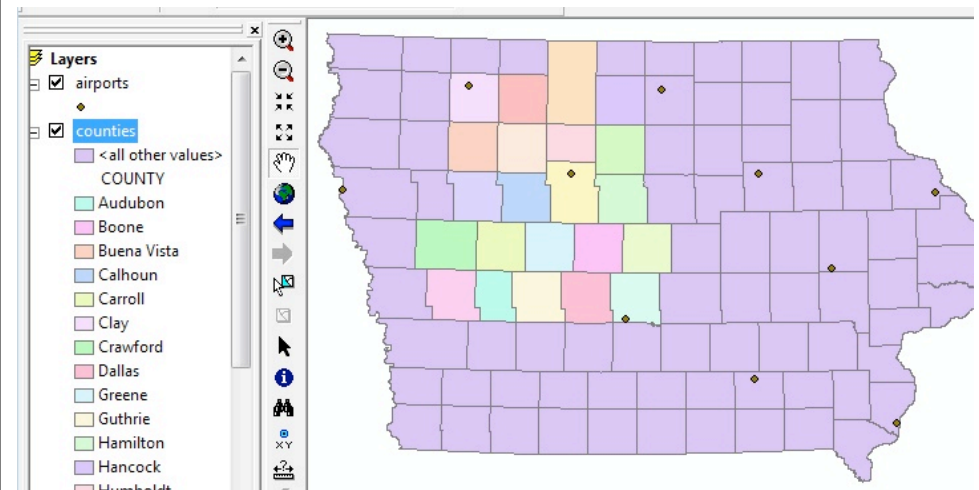
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Ch I follow-along exercise (repairing bad links)

- Copy //delphi/GEOL552/data/follow along data/ch1_class_ex to your student folder (Tip: Press F5 to force a folder content refresh)
- preview the folder’s files ArcCatalog - what types? How many layers?
- double-click on ch1_class-ex.mxd to start ArcMap with it
- Red exclamation mark besides the counties layer
- 2 x click on the red ! (Set Data Source)
- Find counties_short.shp in ch1_class_ex and select it



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Save mxd file as ch1_class_ex_fixed.mxd in your student folder
Exit ArcMap and open ch1_class_ex_fixed.mxd again to check that it worked

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After the break:

- Lab Chapter 1 tutorial 1-44 HW1: ex. 1,4,5 (+6)
- remember to copy \\delphi\data\mgisdata5 to your student folder and use it (delete old mgisdata folder)
- GoogleEarth place markers from HW0:
\\geol552\data\Geol 552 201\student placemarks.kml
- double-click on kml file to view it in Google Earth