Attribute Tables

Attribute Tables

- Stores all the data associated with your geographic features
- Analysis and maps are limited by attribute data
- Social, political, economic, biological, etc.
- Use queries to ask questions about your data
- Use table or spatial joins to ‘enhance’ the attribute table

QUERYING ATTRIBUTE TABLES

Queries

- What is a query?
  - A request to select features or records from a database
- Query Expression
  - A type of expression that evaluates to a Boolean (true/false) value that is typically used to select rows in a table in which the expression is true
- SQL – Structured Query Language
  - A computer language that allows you to create queries to store, retrieve, and edit data in a database

Queries in ArcMap

- Attribute Query:
  - a request for records of features in a table based on their attribute vales
- Definition Query:
  - Also a request for records, but rather than selecting the features in a table, only the features that meet the criteria of the query will be shown on map
  - You can create a set of definition queries that restricts ArcMap to only show the features relevant to your map sheet.

Queries in ArcMap

- Location (spatial) Query:
  - An expression that selects geographic features based on location or spatial relationship
  - Find point features that are contained within a polygon or group of polygons
  - Find features within a specified distance of a feature or adjacent to each other

Writing a simple query in ArcMap

- [pop] >= 100000
  - Where population is greater than or equal to 100,000
- [statename] = WA
  - Where the state name is equal to WA

Writing a complex query in ArcMap

- Where the state name is Washington, Idaho or Oregon
- Correct
  - [statename] = WA or [statename] = ID or [statename] = OR
  - [statename] in (WA, ID, OR)
- Incorrect
  - [statename] = WA, ID, OR
  - [statename] = WA and [statename] = ID and [statename] = OR

Writing a complex query in ArcMap

- A city where the state name is Washington and population is greater than 10,000
- Correct
  - [statename] = WA AND [pop] > 10000
- Incorrect
  - [statename] = WA or [pop] > 10000
  - [statename] = WA and > 10000

Complex SQL Statements

- [CNTRY_NAME] in (select top 5 [CNTRY_NAME] from country order by [POP_CNTRY] desc)
- SELECT a.Chin/(Select MAX(a.chin) from iAbundance as a) AS ChinScore, a.Chum/(Select MAX(a.Chum) from iAbundance as a) AS ChumScore, a.Coho/(Select MAX(a.Coho) from iAbundance as a) AS CohoScore, a.Pink/(Select MAX(a.Pink) from iAbundance as a) AS PinkScore, a.Sock/(Select MAX(a.Sock) from iAbundance as a) AS SockScore, a.Steel/(Select MAX(a.Steel) from iAbundance as a) AS SteelScore, IIf(d.SpeciesRichness=0,0,([ChinScore]+[ChumScore]+[CohoScore]+[PinkScore]+[SockScore]+[SteelScore])/d.SpeciesRichness) AS MultiSpeciesAbundScore, a.nlevel5

FROM iAbundance AS a, Distribution AS d

WHERE (((a.nlevel5)=d.NLEVEL5));

Examples of Queries

- [pop1990] > 100000
  - Select by attribute
  - Definition query
  - Data exclusion query
- Volcanoes in Alaska
  - Select by location

JOINS AND RELATES

Definitions

- Join:
  - Temporarily appending fields of one table to those of another through a common attribute or field to both tables
  - Usually used to attach more attributes to the attribute table of a geographic layer
  - e.g. Adding population to a county file
- Relate:
  - Temporarily connecting records in two tables using a key common to both
- Spatial Join:
  - A table join where fields from one layer's attribute table are appended to another layer's attribute table based on relative locations of the features in the two layers

Joins v. Relates

- Joins
  - used when there is a one-to-one relationship
  - e.g. States and capitals – each state only has one capital
  - Appends attributes making one big table
- Relates
  - used when there is a one-to-many relationship
  - e.g. States and cities – each state has many cities
  - Keeps both tables separate, but they are linked

OID	County
0	Grant County
1	Multnomah County
2	Lane County
3	Wallowa County

County	Population
Grant County	7,630
Multnomah County	701,545
Lane County	339,740
Wallowa County	7,140

Joining tables on common attribute - County

OID	County	Population
0	Grant County	7,630
1	Multnomah County	701,545
2	Lane County	339,740
3	Wallowa County	7,140

Joins both tables into one

OID	County
0	Grant County
1	Multnomah County
2	Lane County
3	Wallowa County

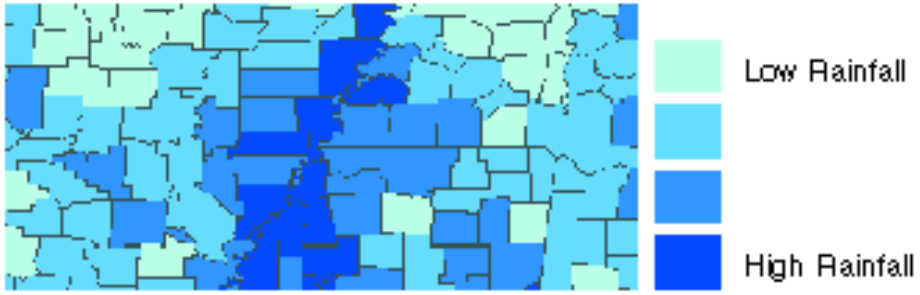
County	Representative
Grant County	Greg Walden
Multnomah County	Darlene Hooley
Multnomah County	Ginny Burdick
Multnomah County	Mary Nolan

Relating tables on common attribute – County

Tables stay separate, but are ‘related’

Shape	FID	County
Polygon	1	Atoka
Polygon	2	Kiowa
Polygon	3	Nowata

County	Rain	Total
Atoka	1.80	10.16
Kiowa	2.34	13.67
Nowata	1.62	11.90

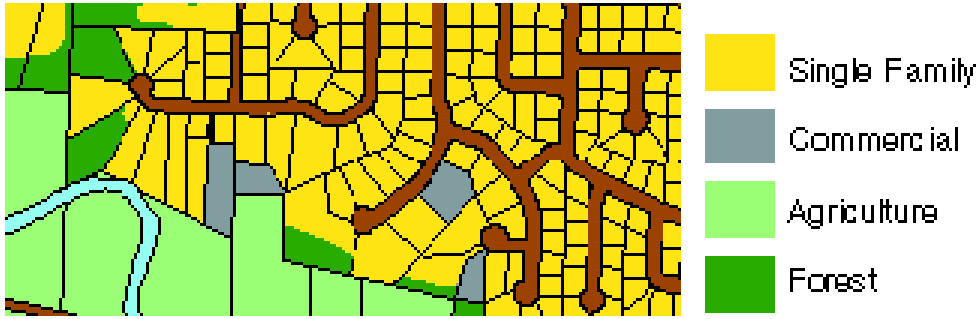


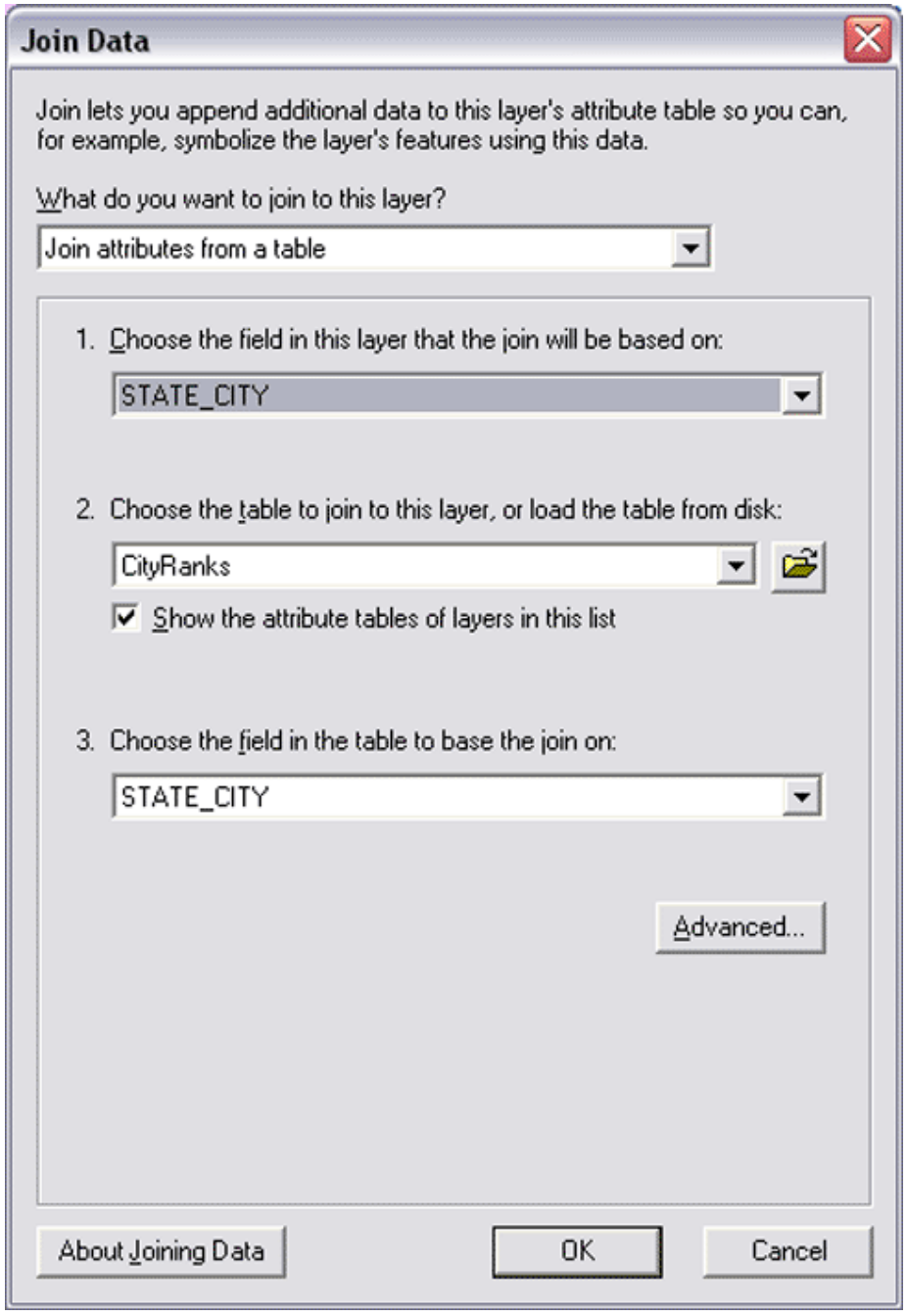
Join: One-to-one

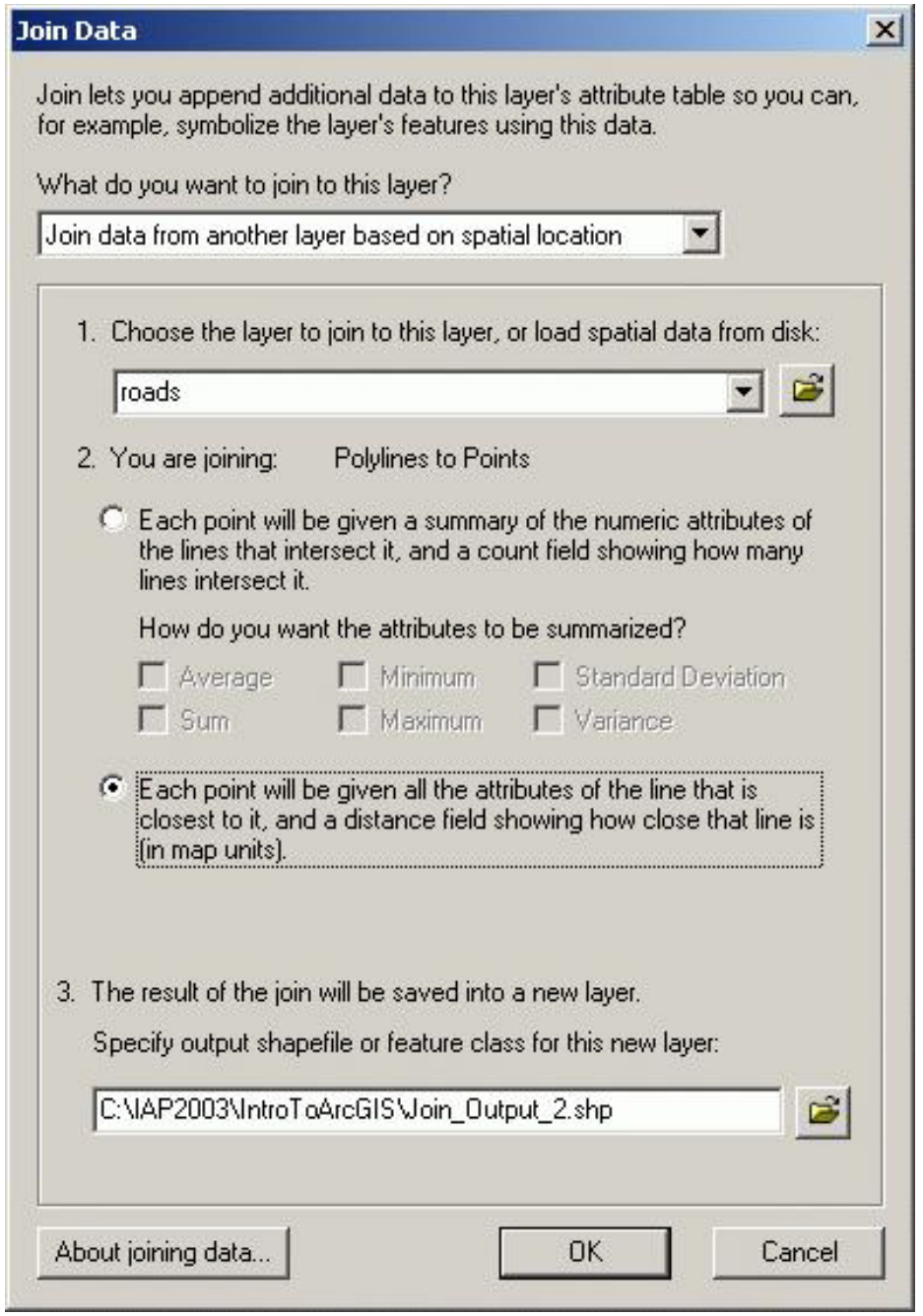
Relate: One-to-many

Shape	FID	LU_Code
Polygon	1	2
Polygon	2	1
Polygon	3	1

LU-Code	Description
1	Single Family
2	Agriculture
3	Commercial




Join Data
Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.
What do you want to join to this layer?
Join attributes from a table
1. Choose the field in this layer that the join will be based on:
STATE_CITY
2. Choose the table to join to this layer, or load the table from disk:
CityRanks
Show the attribute tables of layers in this list
3. Choose the field in the table to base the join on:
STATE_CITY
Advanced...
About Joining Data
OK
Cancel


Join Data
Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.
What do you want to join to this layer?
Join data from another layer based on spatial location
1. Choose the layer to join to this layer, or load spatial data from disk:
roads
2. You are joining: Polylines to Points
Each point will be given a summary of the numeric attributes of the lines that intersect it, and a count field showing how many lines intersect it.
How do you want the attributes to be summarized?
Average
Minimum
Standard Deviation
Sum
Maximum
Variance
Each point will be given all the attributes of the line that is closest to it, and a distance field showing how close that line is (in map units).
3. The result of the join will be saved into a new layer.
Specify output shapefile or feature class for this new layer:
C:\IAP2003\IntroToArcGIS\Join_Output_2.shp
About joining data...
OK
Cancel

Why use a Spatial Join?

- It compares the locations of the features, and joins features from different layers based on their location
- Example: You want to know how many volcanoes exist in each state. A spatial join will add a “count” field to your attribute table that tells you how many volcanoes (pts) fall within each state (polygon)

Joins, Relates and ArcGIS

- Joins and relates allow you to connect nonspatial data to a spatial dataset
- Nonspatial data can be in .dbf or .xls format
- Common fields in both tables must match exactly
  - e.g. Multnomah County and Multnomah Count; NOT: Multnomah county and Multnomah

Joins, Relates and ArcGIS

- Joins and relates are not permanent changes to the shapefile
- You can make a join permanent by: exporting data
- A spatial join will create a new shapefile