

# GEOL 452/552

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## GIS for Geoscientists I

### Lecture 9a - Chapter 4

1

- import table of stand alone tables (use 2003 xls format!)
- Recap of Joining
- Summarize
- get follow\_along\_data/Ch4C\_class\_ex

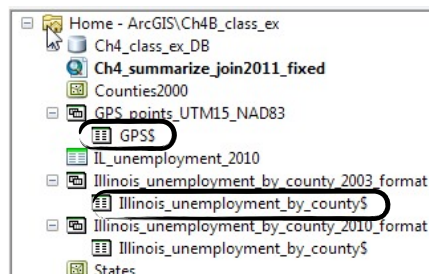
2

## Importing stand-alone table and XY Table

- **Use Excel 2003 (.xls) not .xlsx format**
- Excel: workbook contains 1 or more worksheets
- In ArcCatalog: worksheets end with \$ and are "inside" the workbook
- Standalone: drag/add to ArcMap (Illinois\_unempolyment\_by\_county\$)
- (TOC: List by Source)
- XY Table must have fields for coordinates
- Create Feature Class - From XY Table (GPS\$)

	A	B	C	D	E	F	G	H
1	FIPS	Name	2003	2004	2005	2006	2007	2008
2	17001	Adams	5.4	4.6	3.9	3.6	4.1	4.9
3	17003	Alexander	10.7	9.5	9	8.6	8.7	9.7
4	17005	Bond	6.2	6.2	5.6	5.2	5.5	6.8
5	17007	Boone	8.1	7.6	6.9	5.9	6.9	9.5
6	17009	Brown	4.4	4.2	3.9	3.2	2.9	3.9
7	17011	Bureau	7.2	6.2	5.1	4.7	5.1	6.2

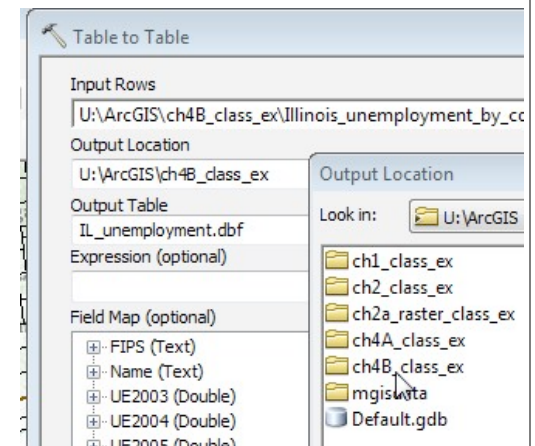
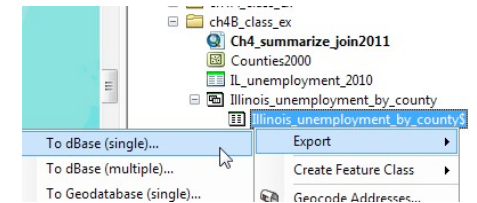
	A	B	C
1	X_coord	Y_coord	Value
2	446260.8	4653020	32.45
3	446258.1	4652924	2.3
4	446086.8	4652992	63.2
5	446141.5	4653200	12.4
6			



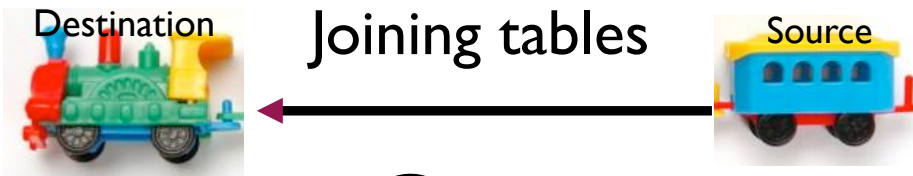
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## Convert (export) a Excel file to a DBase (.dbf) file

- In ArcCatalog: R-Click on worksheet - Export - To dBase (single)
- Brings up the Table to Table Tool
- let's create a .dbf file (old spreadsheet format) called IL\_un
- (or: export into you Default.gdb geodatabase)
- Output location: your ch4B\_class\_ex folder (click Add, do NOT 2 x click on folder)
- Output Table: IL\_unemployment.dbf
- click OK



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**Destination table**

FID	Shape*	AREA	STATE_NAME	STATE_FIPS
0	Polygon	67290.061	Washington	53
1	Polygon	147244.653	Montana	30
2	Polygon	32161.925	Maine	23
3	Polygon	70812.056	North Dakota	38
4	Polygon	77195.055	South Dakota	46
5	Polygon	97803.199	Wyoming	56
6	Polygon	56088.178	Wisconsin	55

**Source table**

STATE_FIPS	POP1990	POP1999	POP90_SQMI	HOUSEHOLD
53	4866692	5773907	72	1872431
30	799065	884214	5	306163
23	1227928	1248908	38	465312
38	638800	637016	9	9
46	636004	729508	9	9
56	453588	482025	5	5
55	4891769	5251093	57	172
16	1096749	1250247	16	16

Join tables on common field (STATE\_FIPS = key field)

**Output**

FID	Shape*	AREA	STATE_NAME	STATE_FIPS	POP1990	POP1999	POP90_SQMI
0	Polygon	67290.061	Washington	53	4866692	5773907	72
1	Polygon	147244.653	Montana	30	799065	884214	5
2	Polygon	32161.925	Maine	23	1227928	1248908	38
3	Polygon	70812.056	North Dakota	38	638800	637016	9
4	Polygon	77195.055	South Dakota	46	636004	729508	9
5	Polygon	97803.199	Wyoming	56	453588	482025	5
6	Polygon	56088.178	Wisconsin	55	4891769	5251093	57
7	Polygon	13343.643	Idaho	16	1096749	1250247	16

**Joined table**

# Join

- temporary fusing of 2 tables into a single table
- Think join *Source to Destination* (as in “attach (connect) a **car** to a **train engine**”, follow the arrow)
- To Join tables must share a **common** field (key field)

- Joins: easy way upgrade a standalone table into geospatial, if it shares a key field with a shapefile
- Joining is initiated from the shapfile
- Joins are temporary (ad hoc) and can be removed again
- To make permanent: export the joined shapefile (Data - Export)

# Rule of Joining

Each record in the destination table must match (go back to ) **one and only one** record in the **source** table.

**Destination table**

FID	Shape*	STATE_NAME	STATE_ABBR
0	Polygon	Hawaii	HI
1	Polygon	Washington	WA
2	Polygon	Montana	MT
3	Polygon	Maine	ME
4	Polygon	North Dakota	ND
5	Polygon	South Dakota	SD
6	Polygon	Wyoming	WY
7	Polygon	Wisconsin	WI

**Source table**

STATE	Count	Sum_DAMAGE	Sum_DEATHS
CA	218	3705234000	
AK	106	32600000	
MT	62	4220000	
WA	67	3775000	
ID	41	1350000	
HI	63	1100000	
OR	24	760000	

**US Counties**

Shape*	NAME	STATE_NAME	S
Polygon	Lake of the Woods	Minnesota	27
Polygon	Ferry	Washington	53
Polygon	Stevens	Washington	53
Polygon	Okanogon	Washington	53
Polygon	Pend Oreille	Washington	53
Polygon	Boundary	Idaho	1E
Polygon	Lincoln	Montana	3C
Polygon	Flathead	Montana	3C

**Attributes of US States**

FID	Shape*	STATE_NAME	STATE_ABBR
0	Polygon	Hawaii	HI
1	Polygon	Washington	WA
2	Polygon	Montana	MT
3	Polygon	Maine	ME
4	Polygon	North Dakota	ND
5	Polygon	South Dakota	SD
6	Polygon	Wyoming	WY
7	Polygon	Wisconsin	WI

One to one

Many (arrow heads) to one (tail)



# How to summarize

**Attributes of Counties**

FID	Shape	NAME	STATE_NAME
0	Polygon	Lake of the Woods	Minnesota
1	Polygon	Ferry	Washington
2	Polygon	Stevens	Washington
3	Polygon	Okanogan	Washington
4	Polygon	Pend Oreille	Washington

1) Choose grouping field: Click on STATE\_NAME  
2) Right-click - Summarize

**Summarize**

Summarize creates a new table containing one record for each unique value of the selected field, along with statistics summarizing any of the other fields.

1. Select a field to summarize: STATE\_NAME **Grouping field**

2. Choose one or more summary statistics to be included in the output table:

- Minimum
- Maximum
- Average **Choose the type of stats (Average) to perform for the AREA attribute**
- Sum
- Standard Deviation
- Variance
- Precip

3. Specify output table: Avg\_County\_Area.dbf **Where to save the summary table to?**

Summarize on the selected records only

About Summarizing Data    OK    Cancel

**ArcGIS Dialog Help**

**About summarizing data**

This dialog allows a table of summary information to be generated for the fields in the selected table. Unique values from a specified field are used as a basis for the summary information.

In this example, the table is summarized on field F1, and the sum of field F2 is added.

F1	F2	Output
A	5	12
A	5	30
A	2	
B	10	
B	20	

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**Table**

OBJECTID	Shape	NAME	STATE_NAME
1	Polygon	Lake of the Woods	Minnesota
2	Polygon	Ferry	Washington
3	Polygon	Stevens	Washington

**Summarize**

Summarize creates a new table containing one record for each unique value of the selected field, along with statistics summarizing any of the other fields.

1. Select a field to summarize: STATE\_NAME

2. Choose one or more summary statistics to be included in the output table:

- AVG\_SALE07
- SQMI
- Shape\_Length
- Shape\_Area
- Minimum
- Maximum
- Average
- Sum
- Standard Deviation
- Variance

3. Specify output table: U:\ArcGIS\ch4B\_class\_ex\Sum\_Output.dbf

Summarize on the selected records only

**Saving Data**

Look in: Home - ArcGIS\Ch4B\_class\_ex

Name: Sum\_Output.dbf

Save as type: File and Personal Geodatabase tables

Save    Cancel

- Result: stand alone table
- save as Dbase (dbf) file or inside a GeoDB

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# Summarize Output Table

**Attributes of Sum\_Output**

OID	STATE_NAME	Count_STATE_NAME	Average_AREA
0	Alabama	67	771.8774
1	Alaska	25	23063.7642
2	Arizona	15	7580.8453
3	Arkansas	75	705.5098
4	California	58	2720.2812
5	Colorado	63	1652.4005
6	Connecticut	8	622.0707
7	Delaware	3	684.862
8	District of Columbia	1	66.0633
9	Florida	37	833.0557
10	Georgia	59	368.7372
11	Hawaii	5	1276.5165
12	Idaho	44	1894.1737
13	Illinois	102	551.8248
14	Indiana	92	395.6555

- Summary table (standalone) is added (here: Sum\_Output.dbf)
- Table of content switches to Source to show the standalone table's file
- Next step: Join Summary table to States

Count\_ (underscore) field is generated automatically (number of features that have been used in summary stats)

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**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

2. Choose the table to join to this layer, or load the table from disk: Sum\_AREA

Show the attribute tables of layers in this list

3. Choose the field in the table to base the join on: STATE\_NAME

**Table**

OID	STATE_NAME	Count_STATE_NAME	Average_Shape_Area
0	Alabama	67	1901159.756.6329
1	Alaska	27	5787341.15776.1166
2	Arizona	15	1860960.7335.0159
3	Arkansas	75	172938679.5933
4	California	58	6647445274.7853
5	Colorado	64	3963595440.4059
6	Connecticut	8	1513408279.4693
7	Delaware	3	1668553276.6134
8	District of Columbia	1	160961166.8931
9	Florida	67	2077756095.9504
10	Georgia	159	908529664.7589
11	Hawaii	5	3302602206.1671
12	Idaho	44	4613695078.0197
13	Illinois	102	1343996239.7305
14	Indiana	92	623491270.4099

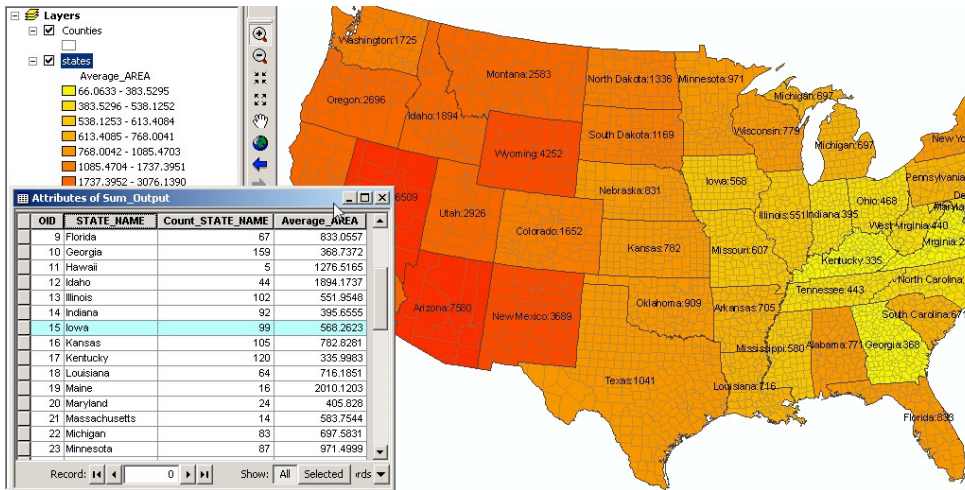
- Remove all joins from States
- Join the Sum\_AREA table (source) to State (destination) with STATE\_NAME as key

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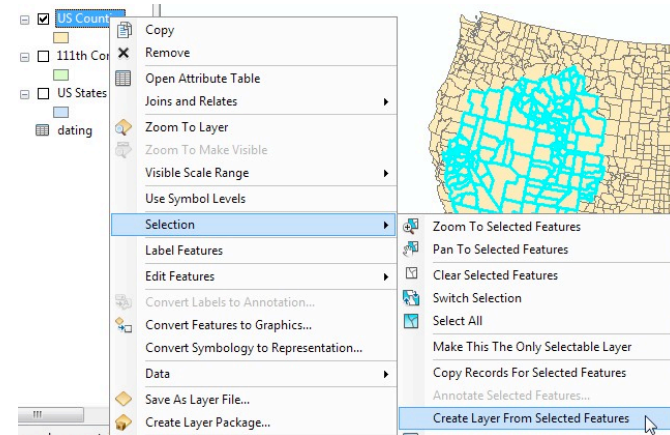
## Summarize county area by state

- Groups the Counties layer's AREA field **by state**
- Get average size of a county **per state** (within each state).
- Also: get the number of counties within each state



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## Make a new layer from selected features



Needed for HW

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## Lab

- Finish chapter 4 Tutorial first
- HW 4 - make sure to read the Blackboard instructions first
- 1,2,4,5,6
- extra: part 2 of 6 and 10
- (due Oct. 4)
- Midterm Review Oct. 13, Midterm Oct 18

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