

# CEIE 410/510 Ex 6 Playing with Attributes

- A**
- Read the ESRI document “Working with Tables”
  - Start a new ArcMap project.
  - Copy States, Counties, and Cities Layer files to your zip drive
  - Add States, Counties, and Cities Layers (from zip drive)
  - Save it as Ex 6
  - Open the attribute table of any of the layers (say cities)
  - Practice the following (Steps 1 – 4 of Activity B)
    - a) Sorting
    - b) Statistics

Right Clicking on col. heading will give you these options

**B**

Attributes of Cities

FID	Shape*	CITY_FIPS	CITY_NAME	STATE_FIPS
0	Point	05280	Bellingham	
1	Point	35050	Havre	
2	Point	01990	Anacortes	
3	Point	47560	Mount Vernon	
4	Point	50360	Oak Harbor	
5	Point	53380	Minot	
6	Point	40075	Kalispell	
7	Point	86220	Williston	
8	Point	11000	Stevens	53
9	Point	11000	Stevens	53
10	Point	11000	Stevens	53
11	Point	11000	Stevens	53
12	Point	22640	Everett	53
13	Point	32060	Grand Forks	38
14	Point	52765	Paine Field-Lake Stickney	53
15	Point	64452	Silver Lake-Fircrest	53
16	Point	11000	Stevens	53
17	Point	11000	Stevens	53
18	Point	11000	Stevens	53
19	Point	11000	Stevens	53

1 (Left) Clicking on col. Heading will highlight the col.

2 Right Clicking on col. heading will give you these options

- Sort Ascending
- Sort Descending
- Summarize...
- Calculate Values...
- Statistics...
- Freeze/Unfreeze Column
- Delete Field

**D**

Now we will learn to summarize data in one or more fields based on the data in one of the fields. Suppose our interest is to find the total urban population (living in cities) for each state, we will obtain this by summarizing POP1990 by State\_Name for the Cities layer as follows

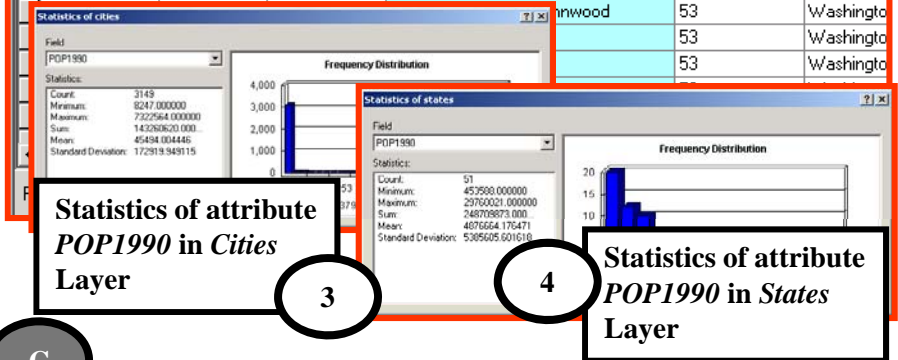
Summarize

Summarize creates a new table containing one record of the selected field, along with statistics summarizing...

- Select a field to summarize: STATE\_NAME
- Choose one or more summary statistics to be included in the output table:
  - CITY\_NAME
  - ELEVATION
  - FID
  - POP1990
    - Minimum
    - Maximum
    - Average
    - Sum
    - Standard Deviation
    - Variance
- Specify output table: D:\My Documents\MyCourses\CityPopulationB.dbf
  - Summarize on the selected records only

More about Summarize... OK

- Summarizing:**
- To summarize Cities data by state, right click on the col. STATE\_NAME
  - Click on Summarize
  - Select the interval or ratio variable to be summarized (POP 1990)
  - Select summary statistics needed; i.e. count, sum, mean, STD etc. As minimum, select the sum
  - Nominal and ordinal variables can also be summarized (try it), but it is not done that often.
  - The resulting summary will be written to a database table (.dbf) and can be linked back to your map. Give the file name as CityPopByState.dbf
  - Say yes to “Do you want to add the result table in the map”



The difference of sums in 3 and 4 has to be Rural population. Question: What is we want to get the rural population for each state? We do this by learning about Summarizing (see D) and editing tables (see next two practice sheets)

D

Continue from previous sheet:  
If you open the newly created (now on your map) *CityPopByState.dbf*, it should look like this.

OID	STATE_NAME	Count_STATE_NAME	Sum_PDP1990
0	Alabama	50	1792789
1	Alaska	4	295181
2	Arizona	28	2686902
3	Arkansas	27	873342
4	California	383	24903920
5	Colorado	39	2237814
6	Connecticut	37	1758302
7	Delaware	5	149727
8	District of Columbia	1	606900
9	Florida	216	7687227
10	Georgia	66	2233318

# CEIE 410/510 Ex 6 Adding New Attributes

E

We now have the following:

- Total population of each state in *States* layer
- Urban population of each state in a table (no shape file)

Our goal is to combine this information and compute the rural population for each state. To do this, we need *Add a field* in which we write this data to.

To add a field, do the following:

- Open the *Attribute Table* of the *States* Layer
- On the attribute table of *States* table Click on *Options* (1)
- You will have several options available – ignore others for now and click on *Add Field* (2)
- Our new field will be a *interval* variable (i.e. numbers)
- Follow the directions in “Working with Tables” and add “*RuralPop*” as a *long integer* variable (3)
- Field *RuralPop* is added (4)

If you are not able to add the field, it is probably because the files you copied to your zip disk have *read only* attributes – especially the file *States.dbf*. To rectify this, use your Windows explorer to browse the files in your zip disk, change the attributes of all the files you copied on to the sip drive by unchecking *Read only* attribute.

FID	Shape*	AREA	STATE_NAME	STATE_FIPS	SUB_REG
0	Polygon	67290.061	Washington	53	Pacific
1	Polygon	147244.653	Montana	30	Mtn
2	Polygon	32161.925	Maine	23	N Eng
3	Polygon	70812.056	North Dakota	38	W N Cen
4	Polygon	77195.055	South Dakota	46	W N Cen
5	Polygon	97803.199	Wyoming	56	Mtn
6	Polygon	56088.178	Wisconsin	55	E N Cen
7	Polygon	93343.643	Idaho	16	Mtn
8	Polygon	9603.272	Vermont	50	N Eng
9	Polygon	84520.49	Minnesota	27	W N Cen
10	Polygon	7073.594	Oregon	41	Pacific
11	Polygon	9254.527	New Hampshire	33	N Eng
12	Polygon	9254.527	New Hampshire	33	N Eng

Now, take a good look at the attribute table of *States* and *CityPopByState.dbf*. Both tables have *STATE\_NAME* as common. We can, therefore, *Join* the information in these two tables by *STATE\_NAME*. To do this, do the following:

- Right click on the layer *States*, Click on *Join and Relates* and then on *Join* (1)
- In the ensuing dialog box, select *Join attributes from a table* (2), followed by *STATE\_NAME* as the join field from the *States* Layer (3), *CityPopByState* as the table from which the attributes are joined (4) and *STATE\_NAME* from *CityPopByState* as the join field. (5) Total population of each state in *States* layer
- After clicking OK, open the attribute table of *States* layer. It will have a different look. (6). Specifically, each of the attributes is tagged with the table source. For example, *states.AREA* is the new tag for the field which was seen earlier as simply *AREA*. Notice that the data from the other table is not tagged the same way.

The urban population of each state is now available to *States* layer via the field *Sum\_POP1990*. The formula for computing rural population, therefore, will be *states.POP1990-CityPopByState.Sum\_POP1990*. We will have to use the *Calculate* feature to compute these values for each state. Do the following to accomplish this:

- Right click on the column heading *states.RuralPop* and click on *Calculate* values (7). (Click Yes on the following warning)
- In the following dialog box, enter the above mentioned formula for computing the values in *RuralPop*. (8) and then click OK.
- The values in *RuralPop* are computed (9) and you can do thematic mapping of states using this data.

# Calculating Field Values

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states.TOT_ACC_RA	states.RuralPop
0	2059274
0	496621
0	917121
0	359201
0	419989
0	255952
0	2423692
0	631180
0	484345
0	1880232
0	1311570

6

states.FEM_ACC_RA	states.MAL_ACC_RA	states.TOT_ACC_RA	states.RuralPop	CityPopByState.OID	STATE_NAME	Count STA	Sum
9428.77	3.42	0	0	47	Washington	82	
9037	7.42	0	0	26	Montana	10	
9832.02	4.72	0	0	19	Maine	13	
10027.99	5.01	0	0	34	North Dakota		
9411.72	6.40	0	0	41	South Dakota		
9410.06	9.70	0	0	50	Wyoming		
9315.72	4.24	0	0	49	Wisconsin		
6952.40	7.19	0	0	12	Idaho		
9476.29	4.75	0	0	45	Vermont		
9180.56	3.89	0	0	23	Minnesota		
8541.69	4.10	0	0	37	Oregon		

7

# Other Issues with Manipulating Data in Tables

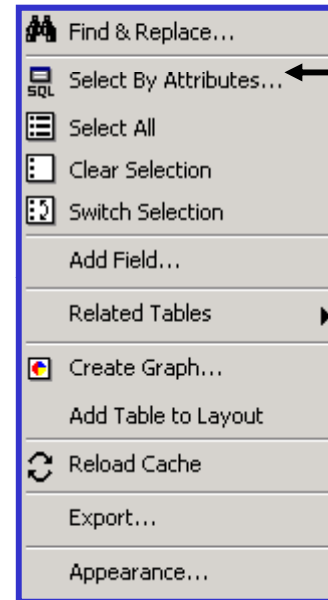
If you are familiar with databases, you would think that we can possibly do some of the database tasks with attribute tables. You are right. However, the database capabilities of ArcMap are limited. For example, you can join or relate tables based only one field (foreign key). Joining based on multiple fields requires further manipulation with custom code and/or ODBC connection to a commercial RDBMS software. These tasks are beyond the scope of this course. However, there are some other basic issues you should know about. These include:

**Selection of features by attributes (1).** This option allows basic SQL queries to select features (you have already done this in earlier labs)

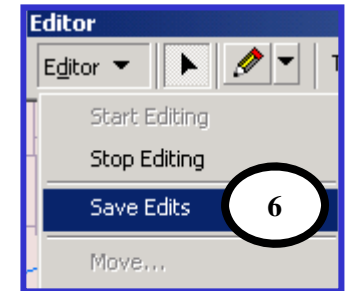
**Editing the values of individual records (2-8):** Say you have encountered incorrect data in your tables. You should be able to correct it by editing the table. For example, the data item shown in step (2) is incorrect and you need to change to 4960,000. You would do these by doing the following:

- Click on editor toolbar (3) and then start an editing session (4). The program will ask you which layers you want to edit. Select the appropriate layers (step not shown).
- After the edit session is started, you will be able to change data in any cell (5). To save your edits you have to explicitly select *save edits*. (6)

Please explore these features – in the class of on your own time. Whichever way you do it, I expect you to know how to do this.



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states.TOT_ACC_RA	states.RuralPop	CityPopByState.OID
0	2059274	47
0	496621	26
0	917121	19
0	359201	34
0	419989	41

states.MAL_ACC_RA	states.TOT_ACC_RA	states.RuralPop	STATE_NAME	Count.STATE
3.42	0	2059274	Washington	
7.42	0	496000	Montana	
4.72	0	917121	Maine	
5.01	0	359201	North Dakota	
6.40	0	419989	South Dakota	
9.70	0	259962	Wyoming	
4.24	0	2423692	Wisconsin	
7.19	0	631180	Idaho	
4.75	0	494345	Vermont	
3.89	0	1880232	Minnesota	
4.10	0	1311570	Oregon	