

GIS II: Data Management Working with Tables Exercise

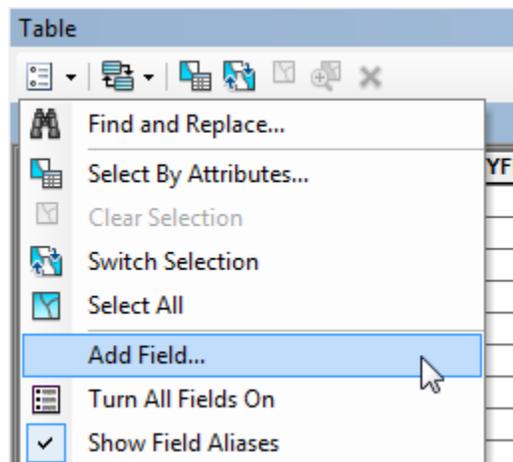
*** Files needed for exercise: *NY_tracts_2010_census.shp*

Goals: The goal of this exercise is to learn how to add fields and manipulate data to better manage the attribute information stored in shapefile dbfs.

Skills: After completing this exercise, you will be able to use the editor toolbar, add fields to tables, and use the Field Calculator to populate fields.

Adding a Field to a Table

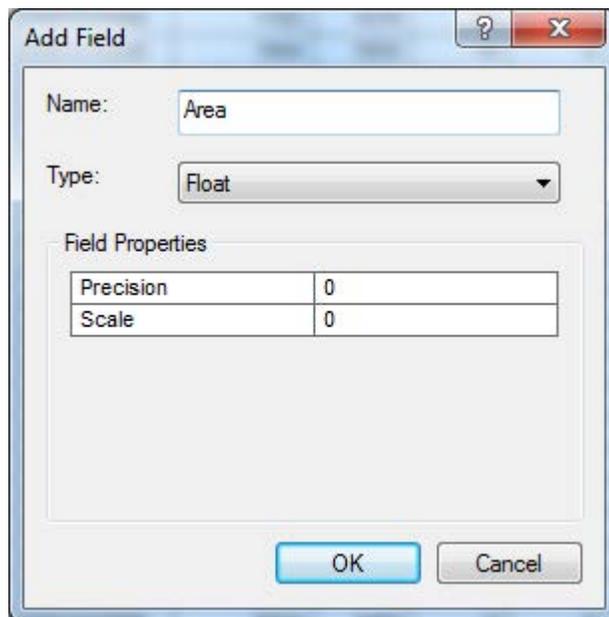
1. Open a new blank map in ArcMap.
2. Click the **Add Data** button  and browse to the Editing Attributes Exercise_Data folder. Choose to add *NY_tracts_2010_census.shp*.
3. Open the attribute table of this shapefile. You can see that it is comprised of the census tracts in New York, with basic demographic information from the 2010 Census.
4. In the attribute table, click on the **Table Options** icon in the top left corner. Choose **Add Field**.



5. You want to create a new field called **Area**. For **Type**:, select **Float**, and leave the **Precision** and **Scale** at their default options of 0.

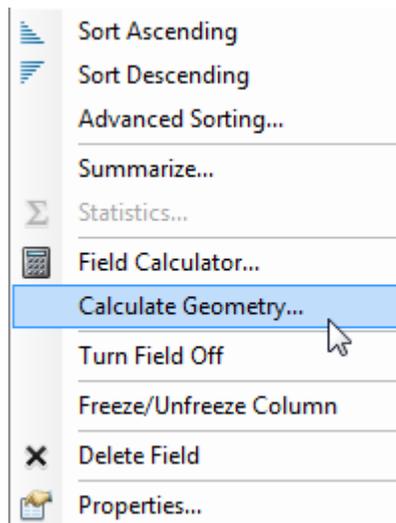
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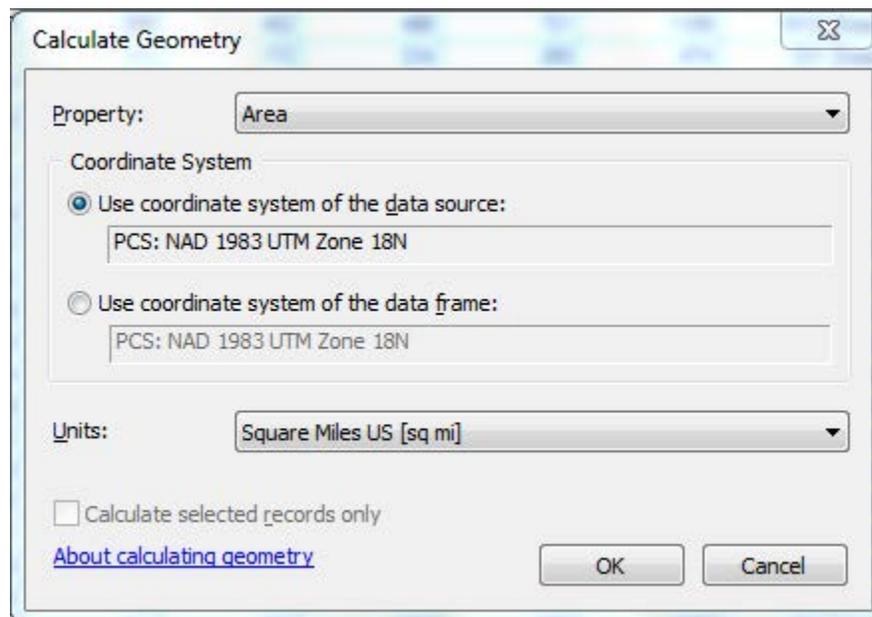
Calculating Geometry

1. You should now have a new field called Area. You are going to use a built-in function to populate this field. Right click on the field name and choose **Calculate Geometry**.



2. You will probably get a warning about calculating outside of an edit session. Click 'Yes' to ignore it and continue. You will learn more about edit sessions soon.
3. In the Calculate Geometry dialogue box, you want to calculate the area. This shapefile already has spatial reference information, so you will accept the default spatial reference. For the units, select *square miles*.

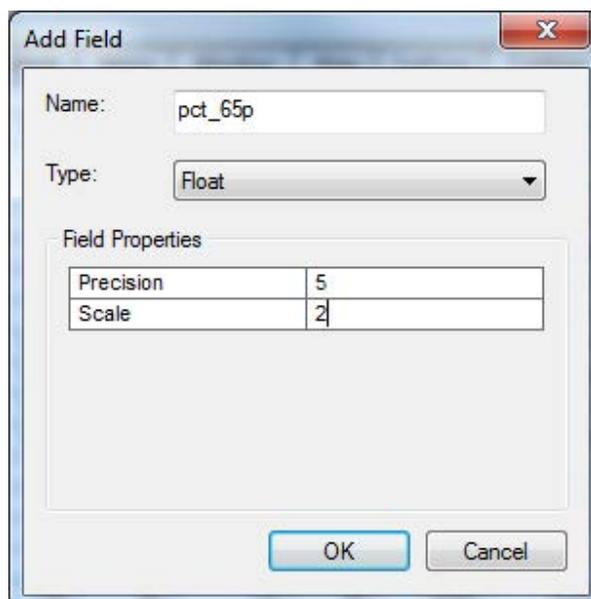
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4. Click **OK**, and the area in square miles of each census tract is calculated for you.

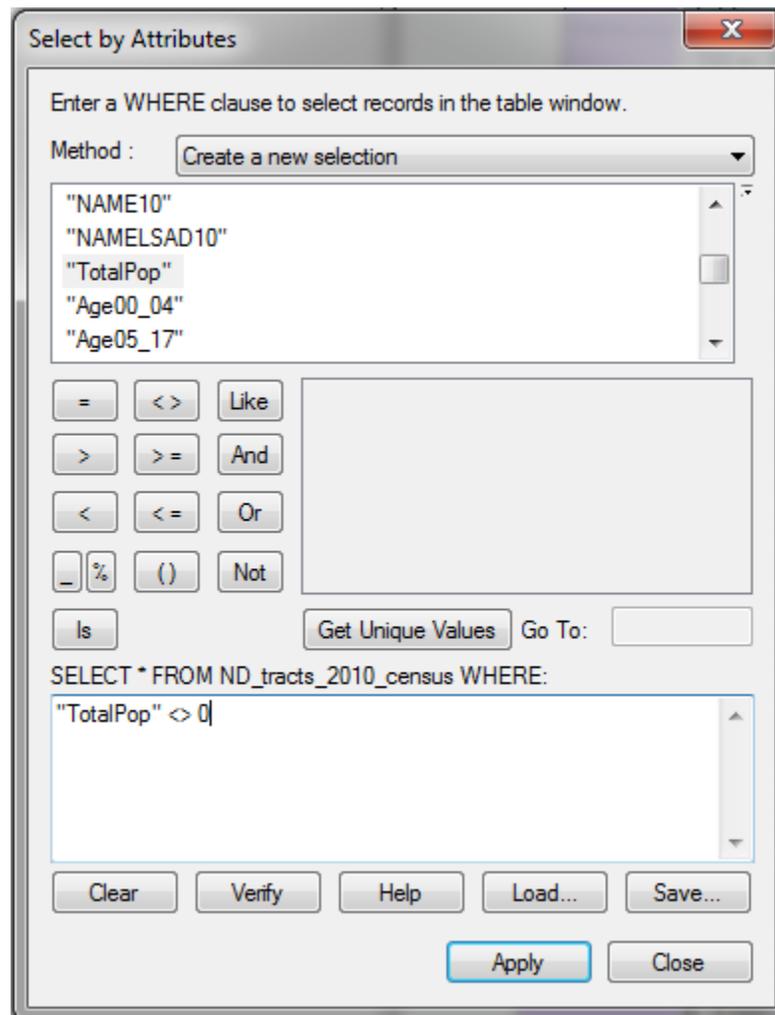
Using the Field Calculator

1. The Field Calculator is a powerful tool that will let you perform a variety of mathematical operations on the existing fields of your table. In this case, you want to find out the percentage of the population that is above 65 years of age.
2. First, you want to add another new field called Pct_65p, also a **Float** type field. Set the Precision to 5 and the Scale to 2.



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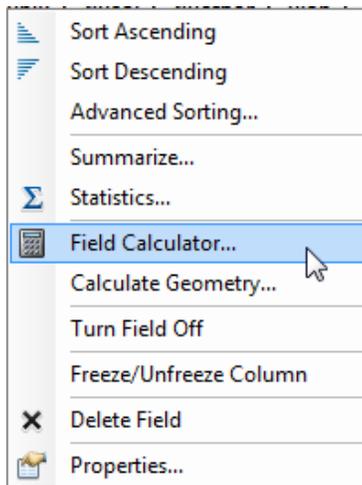
- Because there are census tracts with no people (i.e., the population is 0), we can only compute the proportion of the population that is 65 and older when the population is not 0. So, before we can compute the proportion of the population 65 and older for each county, we need to select tracts where the population is not 0. If you try to use the field calculator with these records you will get an error message.
- From the main menu on the top of the screen, choose **Selection > Select by Attributes**. Create the following statement: "TotalPop" <> 0. Click **OK**.



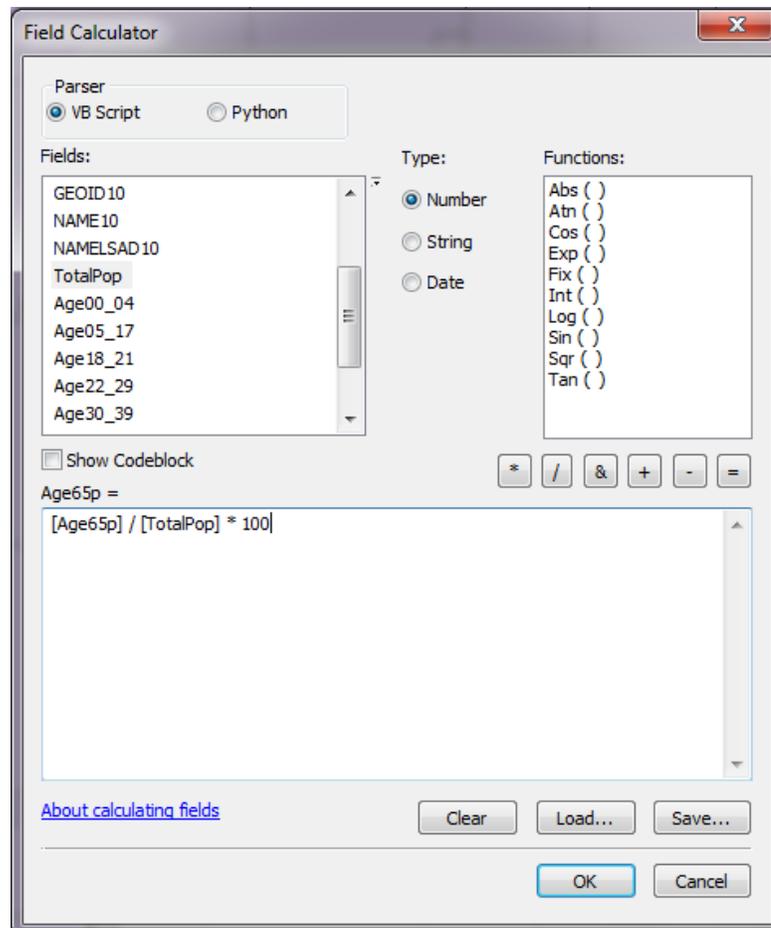
- Right click on the field name of your new field, Pct_65p, and choose the **Field Calculator**. Again, ignore the warning message about calculating outside of an edit session.

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6. Using the interface in the Field Calculator, write the following statement: $[Age65p] / [TotalPop] * 100$.



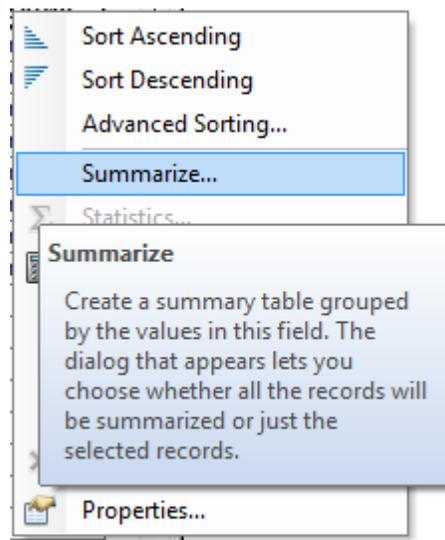
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- Click **OK**, and the percentage of the population in 2010 that was older than 65 according to the US Census is calculated for each census tract that you selected. Notice that the number of decimal places is limited to 2 due to the scale setting that you specified when you created the field.
- You can use the Field Calculator to compute many other fields. Try calculating the population density in people per square mile. Add a new field called Pop_Dense. What would the statement look like to do this?

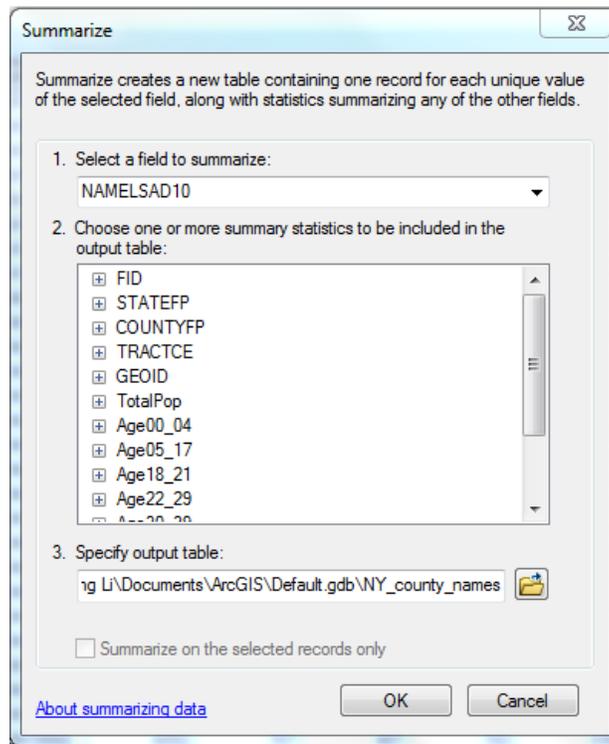
Performing Tasks in an Edit Session

- A report says that some of the county names are misspelled. You are going to correct all misspelled county names. Take a look at the *NAMELSAD10* field in the attribute table. This is the field for county names for each census tracts.
- Since there are more than 4900 census tracts in state of New York, it is impractical to check each individual county names. You are going to use the summarize tool to find out misspelled county names.
- Right click on *NAMELSAD10* field in the attribute table and select **Summarize**. The **Summarize** operation will use the selected field as categories; and calculates summary statistics (such as max, min, average, count, and etc.) for each category.

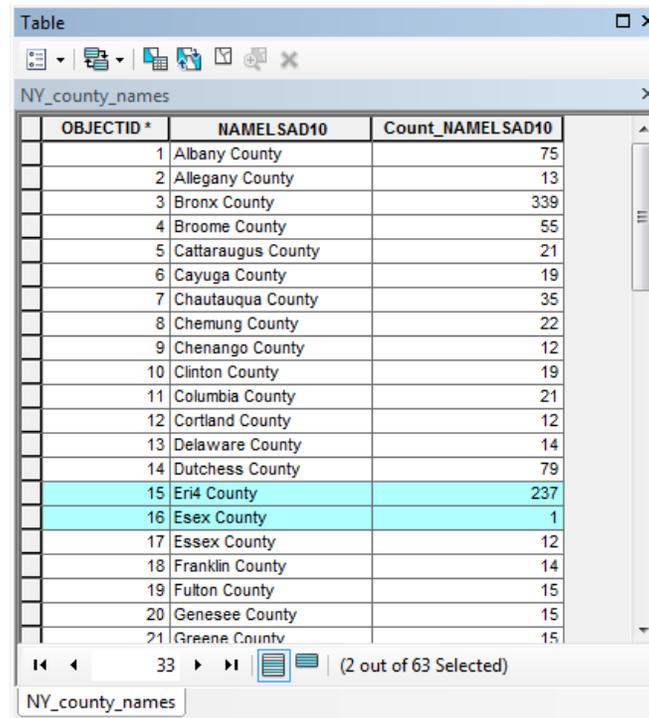


- Specify the output path for the summary table. Make sure the field you are summarizing is *NAMELSAD10* and click **OK**. You don't have to change any other options.

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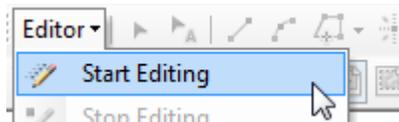
5. Add the summary table to the workspace. We have only 63 county names for us to check.
6. Apparently, “Eri4 County”, and “Esex County” are the typos we are looking for.



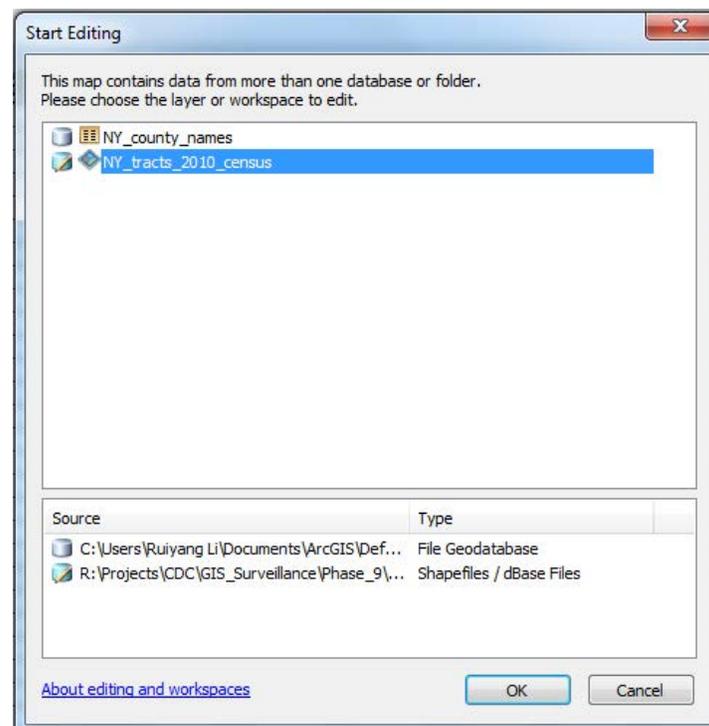
OBJECTID *	NAMELSAD10	Count_NAMELSAD10
1	Albany County	75
2	Allegany County	13
3	Bronx County	339
4	Broome County	55
5	Cattaraugus County	21
6	Cayuga County	19
7	Chautauqua County	35
8	Chemung County	22
9	Chenango County	12
10	Clinton County	19
11	Columbia County	21
12	Cortland County	12
13	Delaware County	14
14	Dutchess County	79
15	Eri4 County	237
16	Esex County	1
17	Essex County	12
18	Franklin County	14
19	Fulton County	15
20	Genesee County	15
21	Greene County	15

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7. Based on the summary table, "Essex County" only have one occurrence in the original table. Let's correct it first. Open attribute table for *NY_tracts_2010_census*.
8. Sort *OBJECTID* field by right clicking on the field name and choosing **Sort Ascending**. The first item on the list should be "Essex County". Let's correct it manually.
9. At the top, go to **Customize > Toolbars > Editor**. In the Editor toolbar, click on **Editor** and choose **Start Editing**.



10. Make sure you selected *NY_tracts_2010_census* to be edited.

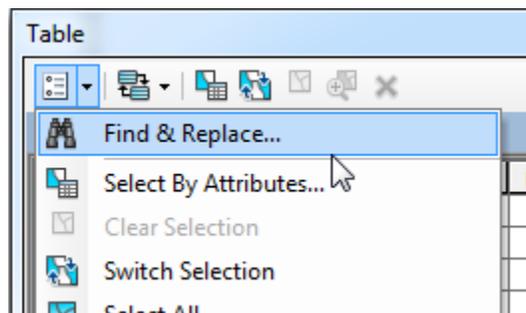


11. Now in your Attribute Table, you will be able to manually click and type in the data boxes. Fix the spelling of Essex County.

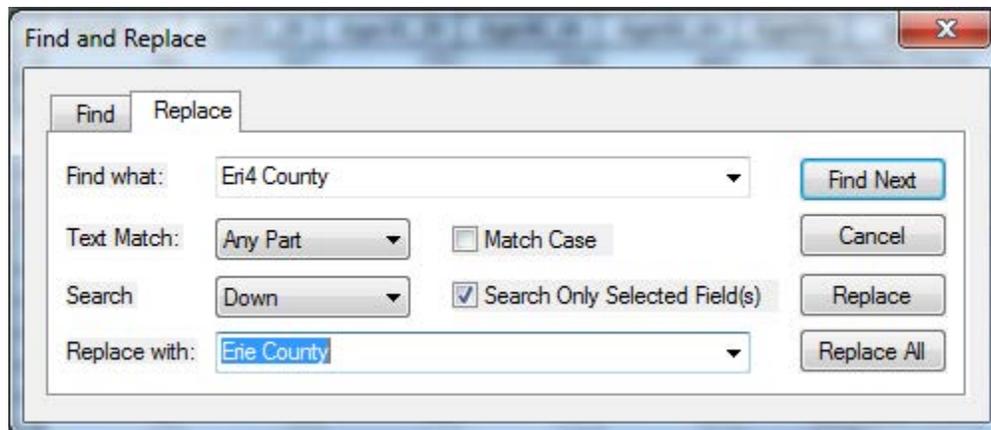
12. In the Editor toolbar, click on **Editor** and **save your edits** when you are done.
13. The next target is "Eri4 County". However, there are too many occurrences of this county for fixing it manually to be practical. You'll use a different method for this.
14. Click once on the NAMELSAD10 field heading to highlight it. Now go to the **Options** button at the top of the table and choose **Find & Replace**.

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15. Click on the **Replace** tab. Choose to Find every instance of *Eri4 County* and Replace it with the correct spelling, *Erie County*. You can only use the replace function in an edit session.



16. Finally, try to add a new field. The option will be grayed out. You cannot add a new field while in an edit session.
17. In the Editor toolbar, click **Editor** and choose to **save your edits** and **stop your edit session**.

If you have time...

1. Explore some of the more advanced options of the Field Calculator. You can write Python code in the Field Calculator, as well as a variety of built-in string and integer functions
2. Experiment with some of these functions. For instance, !NAME_SAD10![0:5] will return just the leftmost 5 characters from the county name field.
3. Reference the Python Cheat sheet for some commonly used functions.

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Python Cheat Sheet

Concatenate Texts

!field1! + !field2!

'Python' + 'Cheat' = 'PythonCheat'

!field1! + ' ' + !field2!

'Python' + ' ' + 'Cheat' = 'Python Cheat'

Convert Types

str(!field1!)

str(50) = '50', str(11.5) = '11.5'

int(!field1!)

int('50') = 50, int(11.5) = 11.5

Substring

!field1![start:end]

"Python"[2:4] = "th"

!field1![start:]

"Python"[2:] = "thon"

Split Text

!field1!.split("char")[index]

"Python_Cheat".split("_")[0] = "Python"

Convert Case

!field1!.upper()

"Python".upper() = "PYTHON"

!field1!.lower()

"Python".lower() = "python"