Lab #5

You have learned how to create query expression with Python. Create a Python script to accomplish the following tasks.

Objectives:

- Construct query expression for ArcGIS data with Python

Dataset:

Use the data from Practice Assignment 10 for this lab assignment.
Set the active workspace as the Practice 10 Data folder.

The Queries:

1. Find the states that have Mississippi River flow through it. In other words, find the states belong to the Mississippi River system
   - There is a field named SYSTEM in **rivers.shp**, which can be used to extract Mississippi River from the feature class.
2. Create a new shapefile for the above query results (states in Mississippi River system).
3. Find the states in Mississippi River system with 2008 Population more than 10,000,000.
   - There is a field named POP2008 in **States.shp**, which contains the 2008 population information.
4. Create a new table contains the attribute table of the states in Mississippi River system with 2008 Population more than 10,000,000
5. Print out the message as you find the states and copy the features into feature class and table.
   - The following output uses **Mississippi.shp** as output feature class name and **POPMiss** as the output table name. You don't need to use the same name for your output.

```
There are 27 states in Mississippi River system.
Copy the feature layer "States" to the feature class "Mississippi.shp"
There are 5 states in Mississippi River system with 2008 Population more than 10,000,000
Copy the attributes of the feature layer "States" to the table "POPMiss.dbf"
```

Lab #6

The Automation Problem:

You need to classify the Missouri counties based on its 2000 population. If the population is less than 10,000, then classify it as LOW, if the population is between 10,000 and 100,000, then classify is as MEDIUM, if the population is more than 100,000, then classify it as HIGH.

- The Inputs:
  - Missouri County is in the Data folder as **MOcnty.shp**.
  - The 2000 Population is stored in the field named "POP2000" in **MOcnty.shp**.
  - A new attribute field name to store the classification results: **LOW, MEDIUM, HIGH**. This field should be created in the script.

- The Processes:
  - Create a new field based on the input field name.
    - The script should check whether the input name is a valid ArcGIS field name.
    - Check whether the new field is already in the attribute table, if yes, delete the field.
    - Create the new field as TEXT type, the length as 10.
  - You will need to use the looping statement and the update cursor to iterate through the record and set the results into the new field.
  - The script should report (print out message) of each county's name, population and the reclassified value as it iterates through the record, such as the following

```
Taney has population of 39703 as MEDIUM
Ozark has population of 9542 as LOW
McDonald has population of 21681 as MEDIUM
Dunklin has population of 33155 as MEDIUM
```

- The script needs to query the newly updated attribute table, and reports (print out message) how many counties have LOW population, how many counties have MEDIUM population, and how many counties have HIGH population.

```
There are 26 out of 115 counties with LOW population
There are 80 out of 115 counties with MEDIUM population
There are 9 out of 115 counties with High population
```

Requirements:

1. Write a script to perform the task described above. Remember the input/output workspace and the template layer should not be limited (hardcoded) by the testing data. The users should be able to use this script for any workspace/dataset. There is no need to create toolbox for script tool, just define these three variables at the beginning of the script, and use the variables throughout the script. You might need to use the following functions, but not limited to.
    - Describe (ArcPy function)
    - ValidateFieldName (ArcPy function)
    - ListFields (ArcPy Function)
    - Add Field (Data Management)
    - Delete Field (Data Management)
    - UpdateCursor (Data Access Module Class)
2. The three input variables should be defined and assigned values at the beginning of the script, after import the module.
3. If the script creates any feature class, feature layer, and/or cursor, they need to be cleaned up (delete) at the end of the script.
4. The final report on how many counties in LOW, MEDIUM, and HIGH must be done through query the results from the newly created field. Do not use counting variable to count the county as you add the attribute value into the field. Perform the query after you have created and updated the field.
5. The total number of counties in Missouri (115) also needs to be retrieved from the table, not hardcoded.