**Geographic Information Science Exercise 8**

**Attribute Data**

These questions will require you to use the skills and information you learned in chapter 7, the tutorial, and the associated lectures.

This exercise will further your familiarity with attribute data in ArcGIS Pro.

Items to keep in mind:

1. Create a new project before beginning the exercise.
2. General location of data files will be provided (see below). You will have to determine exactly which file to use, but the folders you should be working with are identified.
3. Any questions requiring the acquisition of data online will be your responsibility to find the data and download it.
4. Any new tasks required will be described. Otherwise, the tools and techniques required to answer the questions will have been introduced in the tutorials for this lab and any prior labs.

To answer the questions, you will need to use the data in the following folders:

**mgisdata\Usa\**

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**Reading Questions**

**Question 1:** Choose the best field type (i.e., short, float, etc.) for each of the following types of data in a geodatabase:

Populations of countries in the World:

Average precipitation in inches:

Number of counties in a state:

Highway name:

Distances between US cities, in meters:

Birthdays:

**Question 2:** What is the cardinality (ie., one-to-many, etc.) of each of the following relationships? (**HINT:** remember that the target table is the left term (in the above case, “one”) and the join table is the right term).

Students to college classes:

States to governors:

Students to grades:

Counties to states:

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**\*\*\***Use the *store\_openings.csv* file in the Usa folder to answer the following questions:

**HINT**: Remember to put the file into an ArcGIS format first

**HINT:** Remember to check the format of the fields before changing to ArcGIS format.

**Question 3:**

1. What stores (Brand) are listed in the table?
2. How many stores are there?
3. Where (location), and when (date) did the first store open?
4. Where (location) and when (date) did the most recent store open?
5. Is the latest opening listed actually the newest store in the US? How can you tell from the data?

**Question 4:** Create a table that lists each state and the number of stores per state (need to calculate).

**HINT:** Ultimately, we want to be able to map the data

1. Which state has the most stores (and how many)?
2. Which state has the least stores (and how many)?
3. Sort the states by name. Take a screen **capture** of the table (showing at least 20 states) and insert here. Make sure that the state names and the number of stores per state fields are visible.

**Question 5:** Determine the number of stores per 100,000 people in each state (using the *POP2014* data). **HINT:** Save as a new table before using the *Calculate Field* tool.

1. Which state has the most stores per capita (and how many)?
2. Which state has the least stores per capita (and how many)?
3. Sort the states by name. Take a screen **capture** of the table (Showing at least 20 states) and insert here. Make sure that the state names and stores per capita fields are visible.

**Question 6:** Create 2 maps:

1. One showing the number of stores in each state.
2. One showing the number of stores per capita (per 100,000) in each state.
3. Criteria for both maps: Extent = 48 contiguous states. Graduated colors. 5 categories. Include all standard map components (ie. title, legend, etc.)
4. **Capture** each map and insert here.

**Question 7:** Create a chart (scatterplot) to view the relationship between the number of stores in a state and the 2014 population.

1. How good of a relationship is there between the variables?
2. Which state(s) has a higher than average number of stores?
3. Which state(s) has a lower than average number of stores?
4. **Capture** the chart and insert here:

**Question 8:** Create a table that contains the earliest and average opening date of stores for EACH state.

1. Which state has the latest average opening date?
2. What is the average opening date for all of the stores in the country?
3. Sort the table by State name. **Capture** the table (with state names, minimum (earliest) and average opening dates visible) and insert here.

**Question 9:** Read the Help Section under *Help > Maps and Scenes > Time > Visualize time in a map > Visualize temporal data using the time slider* and learn how to set up and operate the time properties and slider. Use it to examine the spread of stores over time based on the earliest opening date in each state.

**NOTE:** See Time Slider attachment for directions.

**HINT:** You need to have the time data (Store opening dates associated with the state features)

1. **Capture** the map showing which states had a store by the beginning of 1975 and insert here.
2. **Capture** the map showing which states had a store by the beginning of 1985 and insert here.
3. **Capture** the map showing which states had a store by the beginning of 1995 and insert here.
4. Briefly describe the pattern of store openings.

**Question 10:** Find a table on the internet with x-y coordinates or a field that allows it to be joined to a spatial data set (eg. Counties, states, etc). Format the table so it can be read by ArcGIS and create a map showing the data.

1. **Capture** the joined table showing some of the Target and Joined data (you can rearrange fields or make invisible excess fields). Insert here.
2. **Capture** the map showing the data. Be sure to include the contents pane with the symbology visible. Insert here.

**Deliverables:**

* This answer sheet.
* The following maps/screen captures (embedded in this document)
  + Question 4c
  + Question 5c
  + Question 6a
  + Question 6b
  + Question 7d
  + Question 8c
  + Question 9a
  + Question 9b
  + Question 9c
  + Question 10a
  + Question 10b