Lab: Map Scale, Map Projections, Data Classification, and Linear Simplification

GEOG 319/658 Exercise #3 FALL 2014

Map Scale, Map Projections, Data Classification, and Linear Simplification

Due: Monday, September 22

A. Map Scale

1. One map has a representative fraction (RF) of 1:1,000,000, and another map has a RF of 1:100,000. Which map is considered to be the larger scale map? Why? (5 points)

2. Two points are separated by 4.32 inches on a1:20,000 scale map. What is the distance between these two points in miles on the Earth? (5 points)

3. Which of the following approaches for depicting scale is appropriate for maps shown on the Internet: RF, verbal scale, or bar scale? Why? (5 points)

4. Compute a RF for the Google scale shown in question 6 on p. 132 of the Peterson textbook. (5 points)

B. Map Projections

1. List three arguments why the Mercator projection serves as the basis of map projection for online map service providers. (5 points)

2. Would it be appropriate to use the Mercator projection for an online dot map depicting the distribution of wheat produced throughout North America? Explain your response. (5 points)

3. Define conformal and equal-area map projections, indicate when each should be used, and give an example of each. (5 points)

C. Data Classification

The following data are the percent Hispanic (or Latino) for counties in Arizona (based on 2012 U.S. Census data).

Apache 6.2
3
Cochise 3.1
1
Coconino 3.7

1
Gila 8.4

Graham 31.3

Greenlee 47.3
La Paz 24.7

3
Maricopa 0.0

Mohave 15.4

Navajo 10.9

Pima 35.4
29
Pinal .0
Santa Cruz 82.7
1
Yavapai 3.9
Yuma 60.5

Classify the above data using each of the following data classification methods: equal interval, quantiles, and maximum breaks. Remember that you will need to sort the data from low to high prior to determining the classes. You must show all work at each step. (20 points)

D. Linear Simplification

1. Download the shapefile for countries of the world from the following site (use the option Download Countries): http://www.naturalearthdata.com/downloads/10m-cultural-vectors/10m-admin-0-countries/).

2. Open www.MapShaper.org , which is a free online utility for performing linear simplification.

3. Under "Simplification method," select the Douglas-Peucker method. Under "Other options," turn off "repair intersections."

4. Click the select button and specify the shapefile (only the .shp file) for the countries that you downloaded in step 1. You can also drag-and-drop the shapefile in the online utility.

5. Using the "Simplify" scroll bar, experiment with changing the number of points retained.

6. How far do you feel you can reduce the number of points and still retain the basic look of countries in the world at the scale depicted on the map? Explain your response. Capture the screen showing your desired level of simplification and submit it along with your written response to this question. (10 points)