GEOG 176 A
2015 Summer Session B
Aug 3rd to Sep 12th

Rui Zhu
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This lab section meets once a week

• Tuesday in Star Lab (Ellison 2610)
  2:00 to 4:50 p.m.
• Office Hour
  10:00 am to noon Tuesday @ Ellison 2610

• Please note:
  No eating or drinking in the lab
  Never turn off the computers, just log off
  The Star Lab is a resource for Geography Department only.
  --Do not allow friends, relatives, or pets to use the facility.
Log-In Information

• student account
  pw: geog14-15

• Go ahead and log on to GauchoSpace as well
  labs will be posted before each Tuesday
To access the lab off hours...

- Star Lab (Ellison 2610)
  If you want to access the lab, please go to the undergraduate advisor:
  Consuelo Rivera (1831 Ellison Hall).

- Free education edition of ArcGIS 10
  One year licence;
  Ask Dylan Parenti (Ellison Hall 1709) for details.
Data management

When working in the lab, refrain from saving files to the computer. They are wiped weekly by the manager;

It also avoids others from copying your work.

Use your own flash drive or cloud storage for saving work.
Individual Work!!!

• Each lab must represent individual work even though you will be working in a group setting with access to help from your TAs and fellow students.

• When a question asks for an expository answer, it must represent your individual work.'

• No copy or plagiarism! We take seriously about this!
Submission of your work

• No hard copy. All work should be uploaded to GauchoSpace before the due!
• Template of your answer sheet could be downloaded from GauchoSpace before each lab;
• Name your homework using your name followed by ‘Lab1’. E.g. RuiZhuLab1.doc (No space or special character in your name!)
• Due dates: will be indicated on GauchoSpace (most are on-week labs!);
• Late submission: will be accepted with a penalty of 10% for each day they are late (including weekends); submission will not be graded 5 days after the due!
## Syllabus (tentative)

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<th>Topic</th>
<th>Due</th>
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<td>Week 1</td>
<td>An Introduction to ArcGIS Desktop Applications, OpenGeoDa, and Google Earth</td>
<td>Aug 11&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>Week 2</td>
<td>Introduction to Spatial Data and Spatial Reference Systems</td>
<td>Aug 18&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>Week 3</td>
<td>Introduction to Data Acquisition, Creation, and Queries</td>
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<td>Week 4</td>
<td>Introduction to Basic Analysis and Cartographic Principles</td>
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<td>Week 5</td>
<td>Introduction to Basic Spatial Data Exploratory Analysis in ArcMap &amp; Introduction to Basic Spatial Data Exploratory Analysis in OpenGeoDa</td>
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<td>Week 6</td>
<td>Introduction to Web GIS/Final Review</td>
<td>No assignment!</td>
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Lab Assignment occupies 45% and each lab has equal weight!
Lab 1: An Introduction to ArcGIS Desktop, OpenGeoda, and Google Earth

DUE:
Tuesday, Aug. 11th 2015
(One week)
Objectives

• Become familiar with the interfaces for *ArcGIS Desktop applications*, *OpenGeoDa*, and *Google Earth*

• Learn how to manage your data

• Learn how to create a basic map
Pre-lab

• Software:
ArcGIS 10.3 (ArcMap, ArcCatalog, ArcGlobe, ArcScene, and etc.)

Open GeoDa (Open Source;
https://geodacenter.asu.edu/software/downloads)

Google Earth (freely available, but need internet access)

• Download from GauchoSpace:
Lab material: Lab1_instructions.pdf
Data: Lab1.zip
Answer sheet: Lab1_Answersheet.docx
ArcGIS 10.3-Interface

Legend

Map Viewer

Toolbars

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Summer 2015
ArcGIS 10.3-Adding Data

Connect To Folder
ArcGIS 10.3-Basic operations

- Zoom in and out
- Pan
- Full Extent
- Identify
- Measure
- ......
ArcGIS 10.3-Render a Map
ArcGIS 10.3-Select Records

Select By Attributes

Layer: Countries_2007

Method: Create a new selection

"STATUS"
"SQKM"
"SQMI"
"POP2007"
"POP2015"

=  < > Like -99 7036
> > = And 7543
> < = Or 9538 11992
< <= (%) Not 13528

Is

SELECT * FROM Countries_2007 WHERE:
"POP2007" = 7543

Clear Verify Help Load Save

OK Apply Close

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Cartography: Best Practices

1. Map Design and Data
   • Theme: What is the purpose of the map?
   • Data Selection: What data are relevant to the map’s subject?
   • Symbology: How is the data represented in graphical form?

2. Subject Area
   • Does it dominate the visual hierarchy?

3. Title
   • Wording: Does it introduce the map subject?
   • Placement: Does it stand out in the visual hierarchy of text?
   • Type Style: Does it enhance the map’s theme?
Cartography: Best Practices

4. Legend
   • Does the title of legend elaborate on the map’s subject?
   • Does it provide visual balance and make use of white space?
   • Do the symbols match those on the map?

5. Scale
   • Options: Scale Bar, Fraction/Ratio, Textual
   • Size and Location: Does it complement visual design?
   • Scale Bar: Units? Intervals? Are smallest units whole numbers?

6. Orientation
   • Choose One (Not Both): North Arrow or Parallels/Meridians
   • Consider map scale and curvature of the Earth
7. Supplemental Text and Illustrations
   • Production Info: Cartographer’s name, date, etc.
   • Attribution: Are data sources & assistance acknowledged?
   • Relevance: Are text and illustrations relevant; avoid clutter?

8. Borders (Neatlines & Frames)
   • Do they provide clear separation of graphical elements?
   • Is a frameless approach more appropriate?

9. Unity and Harmony
   • Do the map elements complement one another, provide visual balance and harmony?

Good Example of Correct SB Map
Output Map

• Title (2)
• Legend (2)
• Scale Bar (2)
• North Arrow (2)
• Neatline (2)
• Data Source and Geographic Coordinate System text (2)
• Name and Date (1)
• Color ramp: One color that ranges from light to dark (1)
• Thousands comma separators visible in the legend (1)
OpenGeoDa

- Computer→labs (\noca) (L:)→OpenGeoDa→OpenGeoDa.exe
- Powerful geo-statistics tool

- Std Dev map
- Cartogram
You'll notice that the interface consists of windows, buttons, and menus; similar to ArcMap. You can see your class breakdown on the left side. You may need to expand the window to see the classes. Each class is followed by a number in parentheses. This number is the number of features in that class. In this case, your features are countries.

Click the Duplicate the Main Map button to create a copy of your map. With this new map active, click the Map drop down menu again and choose Cartogram using POP2007. A map of varying sized dots will appear. Cartograms often distort areas and/or shapes to represent quantities. Arrange your windows so you can see your Standard Deviation map and your Cartogram map.

Select the largest dots on the cartogram map. Notice that the countries will automatically be selected in the other maps.

Click the Open Table button and when the table appears, right-click anywhere in the table to get a context menu.

Choose Move Selected to Top at the top of that context menu to see the records for the features that are selected in the map moved to the top of the table.

Right-click the cartogram and choose Save Image As from the context menu.
Google Earth

• A cool tool to fly around the earth and view the virtual environment.
Tips:

• Q1: Write one paragraph in YOUR OWN WORDS summarizing the possible definitions for GIS.

• Classification Error: After excluding -99 data from the data classes, the value "-99" still shows up in the classed values.

• Work Around: After updating the data exclusion (and seeing -99 still showing up), change the classification type to something else (e.g. to Quantiles) then back to Natural Breaks. This should force the class values to automatically update.
Submission of Lab

• Answer sheet on Gauchospace
• Name your Lab submission: YourNameLab1.doc
• Submit through Gauchospace
• One minute late = One day late (10% off)
  • DO NOT wait until the last day to complete

Due for Lab 1: Aug 11th (Next Tuesday before the lab session!)