Cookbook 11 September 2013
Online GIS (Part 2)

Overview

1. Digitize!
2. What is ArcGIS Online?
3. Mapping (X,Y) Data
4. Address Mapping / Geocoding
5. Homework Assignment #2

1) Digitize!

There are two ways to approach this particular mapping task:

Plan A   Digitize in ArcGIS Online into a Map Notes layer
            Pros: Easy, fast, and easy to include text, links, and photos in the pop-up boxes
            Cons: Not useable in ArcMap, not exportable as shapefile

Plan B   Digitize in ArcMap and upload as zipped shapefile
            Pros: Can be edited in ArcMap and AGO (both features and table)
            Cons: More tedious, more complicated to configure the pop-ups boxes

What's better? That depends on your mapping task!

Resources and Information for Plan B:

- GIS Tutorial , Basic Workbook
- Getting to Know ArcGIS for Desktop, 3rd Edition
- The GIS 20 Essential Skills
- http://www.westfield.ma.edu/uploads/cbraun/digitizingdetails.pdf
- ArcGIS Help
- ArcGIS Resource Center
- Dr. Google

	Task	Challenge
Step 1	Create a new (empty) feature class or shapefile	Define the correct coordinate system
Step 2	Add the new (empty) feature class or shapefile to ArcMap	None!
Step 3	Add needed attribute fields to the attribute table	Define the correct field types
Step 4	Digitize the spatial features	Learn the ArcGIS editing tools
Step 5	Enter the attribute information	None!

2) What is ArcGIS Online?

If applicable: get the ArcGIS App for your smart gizmo:
http://www.esri.com/software/arcgis/smartphones/arcgis-app

Two great ways to use ArcGIS Online

- Use the simple map viewer at http://www.arcgis.com/home/webmap/viewer.html
- Use the more sophisticated ArcGIS Explorer Online: http://explorer.arcgis.com/
  (requires Microsoft Silverlight = does not run on iOS).

Great Resources

- Video Tutorials:
  http://help.arcgis.com/en/arcgisonline/help/index.html#/Videos/010q00000003000000/
- Help and Support:
  http://help.arcgis.com/en/arcgisonline/help/index.html#/Overview/010q0000000200000
  0/
- More resources and tutorials:
  http://www.westfield.ma.edu/cbraun/resources/gis-resources/

2.1) Making a Map with ArcGIS Online

The basic process is easy: you decide on your area, pick a base map, add your own content, and save
and share your map in a variety of ways.

- Goto http://www.arcgis.com/home/ and click-on Make a Map.

- Sign In (upper right corner).

Note the mapping instruction on the left side!

1. Choose your area (search, zoom, and pan), for example the Westfield State University
   campus.

2. Choose your   Basemap, for example Bing Maps Aerial.

3. Create an editable   layer and draw features on your map. Choose an appropriate
   name and template for   your layer. Stick with the Map Notes template for starters!

You can add point features, line features, and polygon features. Include a title and description,
change the symbol as needed, and include links to an image, video, or web site if desired.

4. Save your map – give it a reasonable title, add useful tags, and a quick description.

The rest is all practice and experience, so go ahead and explore!

2.2) Sharing Your Map

There are three ways to share your ArcGIS Online map with the rest of the world:

1. As a link you include in an Email, on Facebook, Twitter, or on a blog.
2. As HTML code that you can copy/paste into a blog or website.
3. As a stand-alone website.

Critical!

To share your map – you need to make it public by checking the box next to Everyone (public).

2.3) Adding Content to Pop-Ups

Text!
Good text in your pop-ups is critical – even on a web map.
Use bulleted or numbered lists or short sentences.

For More Information!
Include a web link in the Description Box for people to get more in-depth information about the campus buildings. You may need to create this website or blog yourself!

Embed a Photograph
Copy the correct URL into the Image URL box.

Link a Website to the Photograph
Copy the website URL into the Image Link URL box.

Videos cannot be directly embedded into pop-up windows at this point. The best strategy for including videos is as a hyperlink to the video; this link could be associated with an image in the pop-up window content.

Linking a YouTube Video
For example: http://www.youtube.com/watch?v=HeMP3BAGUjE
1. Click Share button
2. This gives you a link to copy and paste into your description box as a web link.

Linking a Vimeo Video
For example: http://vimeo.com/42774248
- Simply copy/paste the video URL into your description box as a web link.

It's easy to link/embed content such as photographs or videos.
The main concern: who 'owns' the content and how is it stored?

- If you link/embed content that's stored somewhere in the Cloud by someone else on some server somewhere…you have no control, the content could disappear, and your links and embeds are broken.
- It is best to use your own online photo album and upload your own videos to your own Youtube or Vimeo album.
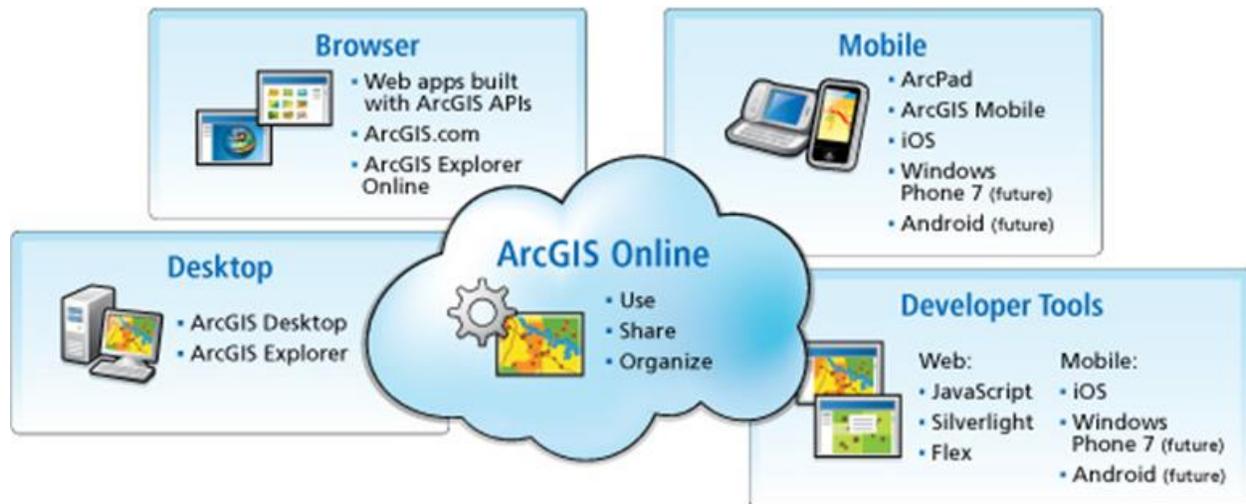
3) Mapping (X,Y) Data

Plan A: From Scratch!

- Create an empty feature class.
- Digitize the spatial data.
- Enter the attribute data.

Example:
Locations of where you collected soil samples (spatial data) and their chemical composition (attribute data).

Plan B: From Spatial Data!

- A list of addresses
- A list of geographic coordinates

Here you bring your data typically from a spreadsheet into ArcGIS and save as a new feature class.

Examples:
- Spreadsheets with GPS points of car break-ins (spatial data) and the make/model of the car (attribute data).
- Collect spatial data with a GPS, Google Earth, or from Angelina…

General Procedure

1. Know the units of your geographic coordinates and convert them to decimal degrees. ArcGIS can only handle decimal degrees!
2. Know the coordinate system / datum of your geographic coordinates – you need that when you add the data to ArcGIS.

GPS is (usually)   WGS84
Google Earth is   WGS84

3. Add as (X,Y) data to ArcMap.
4. Export as feature class or shapefile.
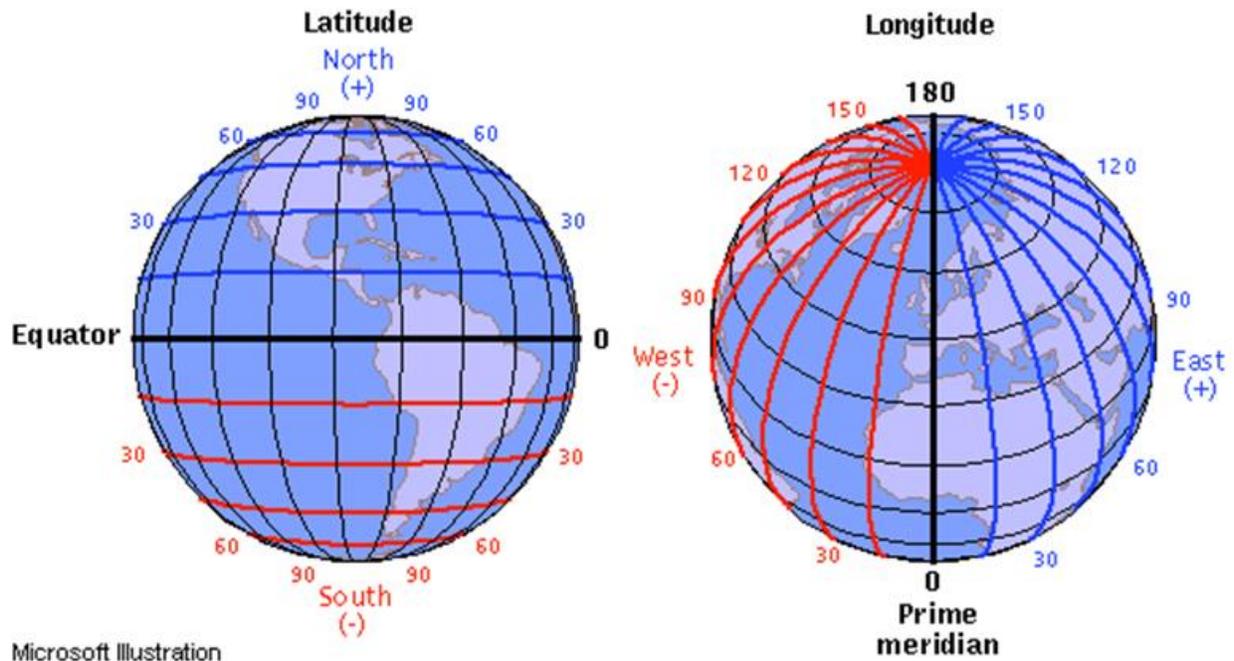
$$DD = \deg + \frac{min}{60} + \frac{sec}{60^2}$$

$$where, DD = decimal\ degrees$$

$$\deg = 79$$

$$min = 22$$

$$sec = 34$$

$$DD = 79 + \frac{22}{60} + \frac{34}{60^2}$$

$$= 79 + 0.36667 + 0.0094444$$

$$= 79.376111 DD$$

Microsoft Illustration

Resources and Information:

- http://outreach.cast.uark.edu/east/toolkit-cast/geospatial_technologies/esri_arcgis/av_geocode_coord.html
- http://www.westfield.ma.edu/uploads/cbraun/garp0544_cookbook04082013_xy.pdf
- www.westfield.ma.edu/cbraun/resources/gis-resources/
- http://ocw.tufts.edu/data/54/626663.pdf
- http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#//00s50000001z000000
- http://gis.mtu.edu/?p=205

4) Address Mapping/Geocoding

Geocoding = Address Mapping

Geography
- *Where? - Why? - How?* Things occur on Earth
- Geography is to Space what History is to Time.

Geographic Information
- Information that includes the location of the information in some kind of mathematical format (street address, latitude/longitude, x/y/z coordinates, etc.)

Geographical Information System
- Geographic information that is systematically organized (= as a database)

➔ *If we have geographical information, organized in a systematic manner, then we can use a computer for quantitative geographic analysis.*

Geospatial Data or Information
- Data that include the location of the data in some kind of systematic mathematical format.

We use two different mathematical formats for locations:

Street, City, State, Zip Code.
That's the system that we are all used to.
One problem: the address system is not uniform between different countries of the world, which makes it difficult when you deal with different countries.

Latitude and Longitude = the Geographic Grid.
The geographic grid is great because it works the same way no matter where you are on the planet!

➔ ArcGIS (our GIS software) allows us to use both systems and even converts easily between them!
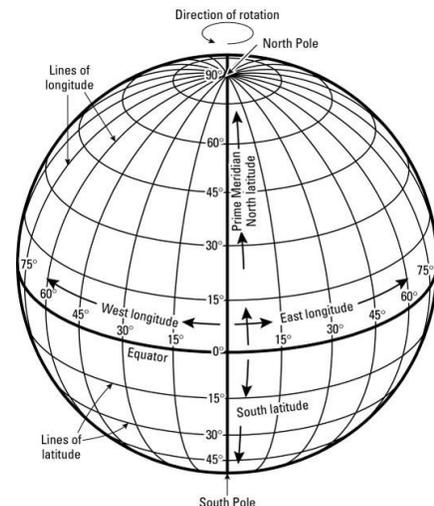
Example: Carsten's House

Street Address	Geographic Coordinates	
110 Haywood Street	Latitude:	42.598631°N
Greenfield, MA 01301	Longitude:	-72.586614°W
USA		

Both formats are useful. If you want to send me a present with the U.S. Postal Service you would use my street address. If you want to find my house in a GIS you can use both formats!

Geocoding is the process of transforming a description of a location—such as a pair of coordinates, an address, or a name of a place - to a location on the earth's surface. You can geocode by entering one location description at a time or by providing many of them at once in a table. The resulting locations are output as geographic features with attributes, which can be used for mapping or spatial analysis.
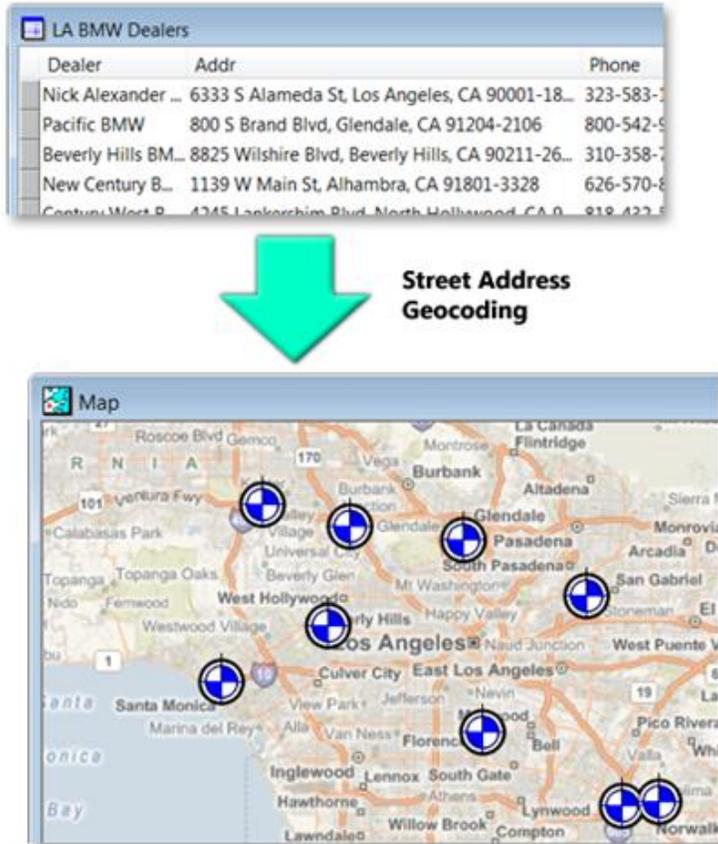
Resources and Information

- http://blogs.esri.com/esri/gisedcom/2012/03/26/fun-with-gis-114-street-address-matching/
- http://resources.arcgis.com/en/help/arcgisonline/index.html#/About_CSV_TXT_and_GPX_files/010q0000008v000000/
- www.westfield.ma.edu/cbraun/resources/gis-resources/ (Geocoding)

5) Homework Assignment #2

Purpose: (1) review and learn to create new geospatial data using digitizing, adding (X,Y) data, and geocoding; (2) use those data in ArcGIS Online, and (3) share ArcGIS Online maps.

Part 1: Digitizing

- Complete the digitizing example map from 9 September 2013 and *email* the link to your ArcGIS Online map.
- In your report create a 1 to 2 page tutorial / instruction manual outlining the (main) steps needed to create such a map. Consider this: a few years from now you are given a similar task in your job – what would *you* need to remember in order to complete this task efficiently?

Part 2: Adding (X,Y) Data

- Complete our example from 11 September 2013 in ArcGIS Online. Or, if you prefer: choose at least 5 different latitude/longitude pairs that are useful for you. Send me the *link* to your ArcGIS Online map.
- In your report create a 1 to 2 page tutorial / instruction manual outlining the (main) steps needed to create such a map. Consider this: a few years from now you are given a similar task in your job – what would *you* need to remember in order to complete this task efficiently?

Helpful!
- http://www.westfield.ma.edu/uploads/cbraun/spreadsheeting_gis_data.pdf
- http://www.westfield.ma.edu/uploads/cbraun/garp0544_cookbook04082013_xy.pdf
- http://resources.arcgis.com/en/help/arcgisonline/index.html#/Adding_layers_from_files/010q000000m6000000/
- http://resources.arcgis.com/en/help/arcgisonline/index.html#/About_CSV_TXT_and_GPX_files/010q0000008v000000/
- http://www.westfield.ma.edu/cbraun/resources/gis-resources/ (ArcGIS and MS Excel)

Part 3: Geocoding/Address Mapping

514 East Main Street, Westfield, MA 01085
179 Dagget Drive, West Springfield, MA 01089
655 Memorial Drive, Chicopee, MA 01020
136 Elm Street, Enfield, CT 06082
2001 Boston Road, Wilbraham, MA 01095
350 Russell Street, Hadley, MA 01035

- Map these six addresses using ArcGIS Online and *email* the link to your map.
- In your report create a 1 to 2 page tutorial / instruction manual outlining the (main) steps needed to create such a map. Consider this: a few years from now you are

given a similar task in your job – what would *you* need to remember in order to complete this task efficiently?

Helpful!
- http://blogs.esri.com/esri/gisedcom/2012/03/26/fun-with-gis-114-street-address-matching/
- http://resources.arcgis.com/en/help/arcgisonline/index.html#/About_CSV_TXT_and_GPX_files/010q0000008v000000/
- www.westfield.ma.edu/cbraun/resources/gis-resources/ (Geocoding)

Part 4: The Whole Enchilada!

Watch this video – this video shows you all you need to know about adding GPS data (or any type of geospatial data from a MS Excel spreadsheet) to ArcGIS Online. You'll see how to:

1. Add data to AGO.
2. Classify the data.
3. Symbolize the data.
4. Present the data.
5. Save and share the map.

http://www.youtube.com/watch?v=SS81rq1Ml5Y&feature=share&list=PL4412589C6E9CD867

The example uses fish observations while scuba diving around Hawaii – but surely you have your own ideas of what you can map: all you need is the location information and the attribute information for whatever you want to map.

- Create a MS Excel spreadsheet of something you find interesting and reproduce what Charlie Fitzpatrick demos in this video. Send me the *link* to your ArcGIS Online web application.
- In your report create a 1 to 2 page tutorial / instruction manual outlining the (main) steps needed to create such a map. Consider this: a few years from now you are given a similar task in your job – what would *you* need to remember in order to complete this task efficiently?

Deliverables

Please submit professional report using proper English language and professional formatting and layout. Think in terms of using it as a sample of your work for a job interview. Please include a cover page and page numbers in the page footer of all pages. Plus, send me the four links to your ArcGIS Online maps.

- Due Date: Monday 16 September 2013 at the beginning of class.

➔ **Contact me for help or clarification of this assignment or my expectations as needed.**