

Intro to ArcGIS: Part 2

Download and unzip the workshop data to your student storage space (X:\) from:

http://www.brocku.ca/maplibrary/Instruction/Intro_to_ArcGIS_Part2.zip

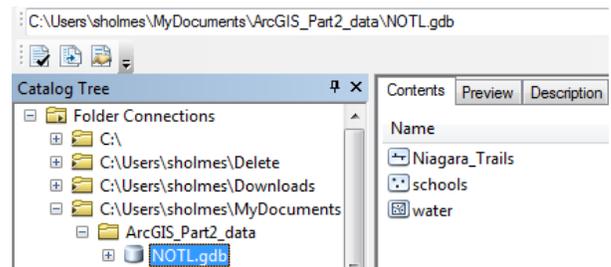
A. ArcCatalog

“Windows Explorer” is used to copy, move, delete, preview and create computer files. “ArcCatalog” is the comparable utility for working with spatial data in ArcGIS.

What you see in Windows Explorer

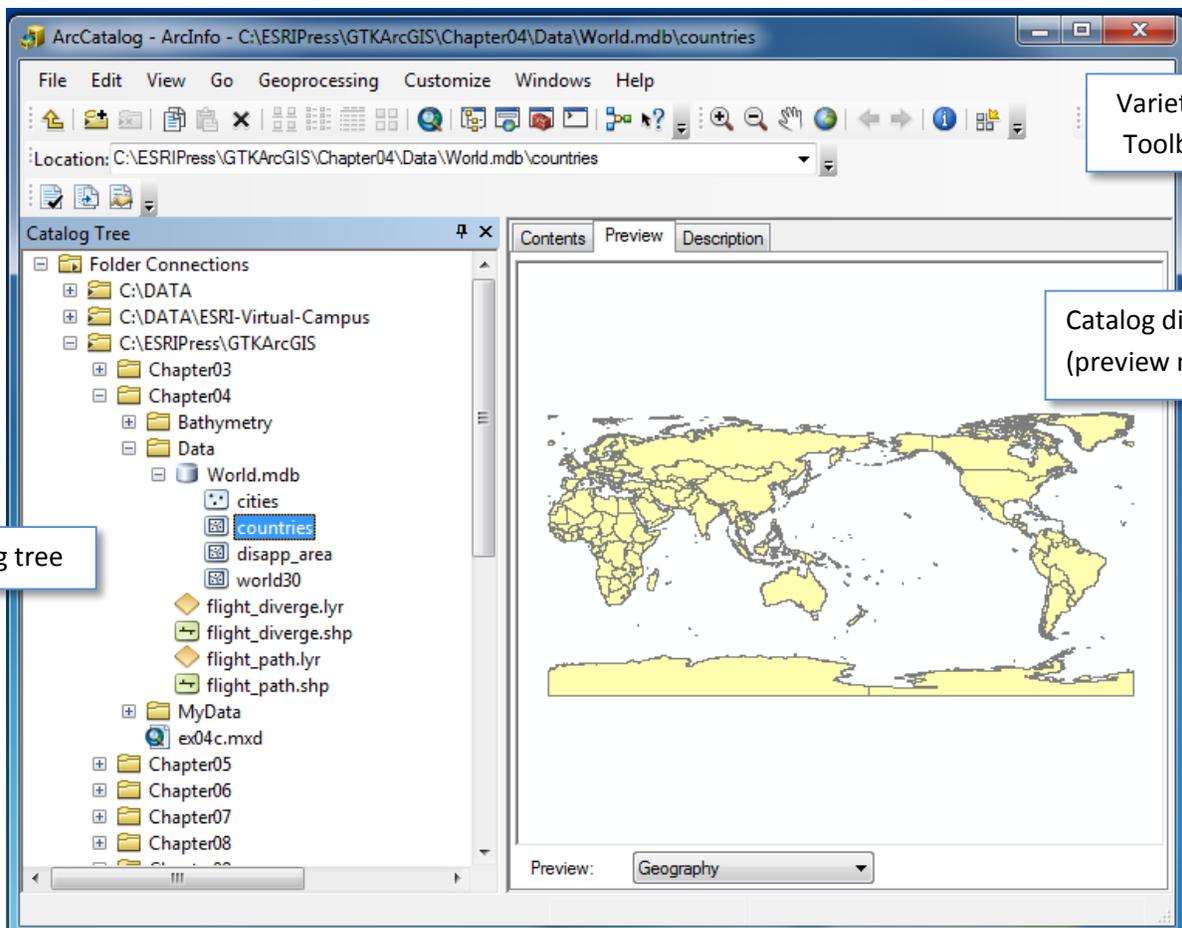
Name	Date modified	Type	Size
_gdb.LIBR-WMLSJ.5096.4672.sr.lock	5/30/2013 9:30 AM	LOCK File	0 KB
_gdb.LIBR-WMLSJ.5412.5416.sr.lock	8/15/2012 3:34 PM	LOCK File	0 KB
a00000001.freelist	8/15/2012 3:35 PM	FREELIST File	13 KB
a00000001.gdbindexes	7/29/2011 11:40 AM	GDBINDEXES File	1 KB
a00000001.gdbtable	8/15/2012 3:35 PM	GDBTABLE File	1 KB

What you see in ArcCatalog



ArcCatalog is a stand-alone data management tool.

1. Run ArcCatalog from START > All Programs > ArcGIS >



Variety of
Toolbars

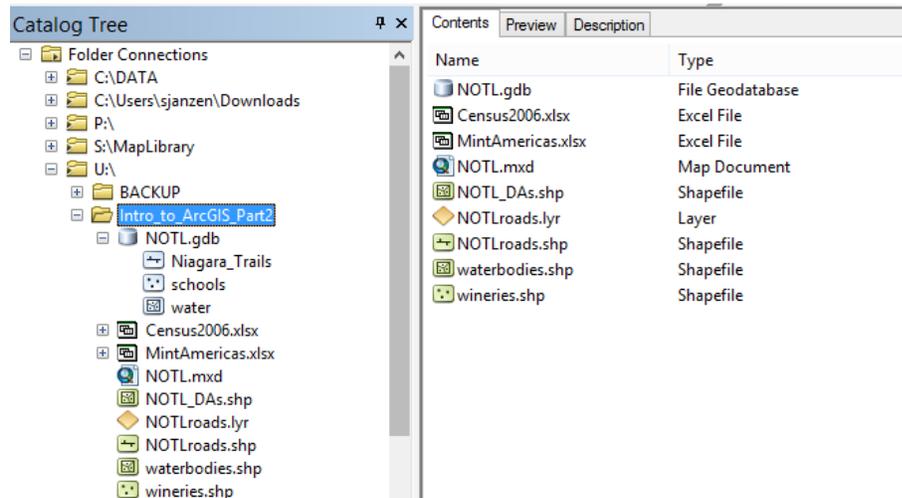
Catalog display
(preview mode)

Catalog tree

Making a Connection (to a directory, dataset, server)

To access data files a preliminary connection to a folder must be made.

1. Click the Connect to Folder icon  and navigate to **X:** (be sure to select only the folder) and click OK.
2. From the Catalog Tree on the left, click the “+” sign to expand the X:\ folder.
3. Double-click the “Intro_to_ArcGIS_Part2” folder to expand it and view its contents.



4. To learn more about these file types, use the attached *Glossary* or access the *GIS Dictionary* on esri.com
5. Change the Contents view from *large icons*, *list*, *details* and *thumbnails* by clicking these buttons 
6. From the Catalog Tree, select *NOTLroads.shp*
7. Click the Preview tab from the Catalog display window. A preview of the data appears. This window is interactive such that you can zoom with the magnification tools and explore the data using the Identify tool.
8. From the bottom of the window change the Preview from *Geography* to *Table*. This preview affords a look at the associated attribute table for the data.
9. Click the Description tab at the top of the display window to access information about the dataset. This information is referred to as ‘metadata’.
10. Click the Contents tab before continuing.
11. Thumbnails provide a quick picture of the data and can be useful when looking for specific data layers.

Create a New Geodatabase

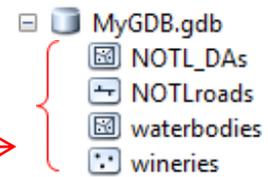
Same as in Windows Explorer, there are Copy, Paste and Delete file functions on the Standard toolbar 

1. To create a new geodatabase, select the folder connection to **X:** from the Catalog Tree (the left pane in ArcCatalog); right-click the folder and select New > File Geodatabase. Provide a unique name, such as **MyGDB**, and hit ENTER. Hit F5 to refresh the view.
2. To add layers to the database, right-click the new item and select Import > Feature Class (multiple)...

The resulting dialogue window allows the import of many feature classes all at once.

- Under *Input Features*, click the Browse  button.
- Navigate to **X:\ArcGIS_Part2_data** folder, hold down the **CTRL** key and select the *waterbodies*, *wineries*, *NOTL_DAs* and *NOTLroads* shapefiles (NOT the .lyr file).
- Click Add.
- Accept the default output geodatabase (should be the one you just created).
- Click OK. This process may take a few minutes so be patient. A popup will appear indicating success.

Expand the new geodatabase in the Catalog Tree to view the new content. 



B. Adding Data & Symbology to ArcMap

- Run ArcMap by clicking the button  at the top of the Catalog window.
- At the Getting Started window, click **Browse for more...** under Existing Maps on the left.
- Browse to **X:\Intro_to_ArcGIS_Part2\NOTL.mxd**. Click Open
- Click the Catalog button  from the main toolbar at the top. This button opens a panel to the right which acts as a 'quick access' version of ArcCatalog.
- Expand the connection to "X:\\" by clicking the "+" symbol.
- Double-click **MyGDB.gdb** (the list of feature classes appears below the catalog tree).
- Select the *NOTL_DAs* layer and drag it to the ArcMap map window. Repeat to add the wineries.
- Another way to add layers is to click the Add Data button  from the main toolbar at the top, navigate to *MyGDB.gdb*, select the *NOTLroads* feature class, and click Add.
- You will notice that some of the waterbodies are now hidden by the *NOTL_DAs* polygon layer. To rectify this, under the *Table of Contents*, choose **List By Drawing Order** .
- Next, click and drag the waterbodies layer above the *NOTL_DAs* layer (but still below *wineries* and *NOTLroads*).

Import Symbology for a Data Layer

- To apply a *symbology layer file* to the roads, double click *NOTLroads* to access Layer Properties.
- Click the Symbology tab.
- Click the Import button.
- Click the Browse  button beside *Layer:* and navigate to **\Intro_to_ArcGIS_Part2\NOTLroads.lyr** and click Add.
- Accept the default import options by clicking OK twice and a final OK to the Layer Properties dialogue box. Notice the several categories of roads.

Symbol Mapping

- To display winery revenue data using symbology, double click *wineries* to access Layer Properties.
- Click the Symbology tab.
- Select **Quantities** from the "Show:" pane on the left, then *Proportional Symbols*.
- From the **Value** dropdown, select *Revenue_US*.
- Under **Symbol**, click the *Min Value* symbol and select an appropriate symbol. In this case, change the size to 5.
- Click OK twice to return to the map window and see your results.

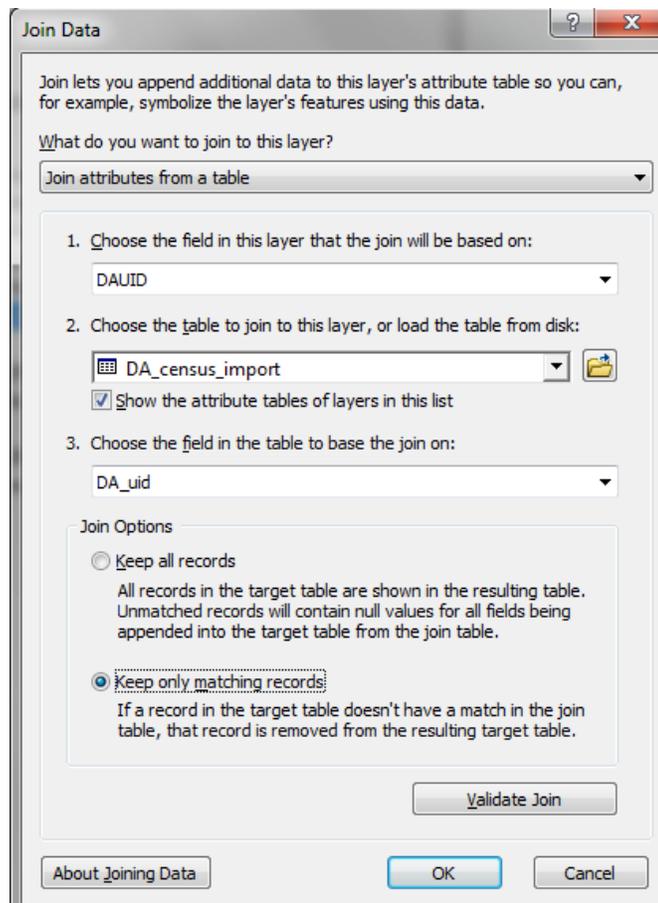


C. Census Mapping

Joining Numeric & Spatial Data

The map includes a layer of census dissemination area boundaries but needs census data joined for thematic mapping.

1. Click Add Data , navigate to the `\Intro_to_ArcGIS_Part2\` folder and double-click `Census2006.xls`. The listing with a dollar sign indicates a full worksheet while the other represents a 'named range' or selection of cells that can be added. Select the named range `DA_census_import` and click Add.
2. Right-click the table layer and select Open to explore the census data. Notice the **DA_uid** field. This unique identifier is common to the attributes associated with the DA boundary file.
3. Right-click NOTL_DAs and select Open Attribute Table. Notice the same **DAUID** field.
4. This common field will be used to join the table of census statistics to the boundary file.
5. Close the attribute tables by clicking the X in the upper right corner of the Table window.
6. Right-click the NOTL_DAs layer and select **Joins and Relates > Join...**
7. Read through the Join Data dialogue box making the appropriate field selections (DAuid).
8. Check the option to **Keep only matching records**.
9. Click Validate Join to test your join. If it is good, click Close and OK to execute the join.



10. To view the results, right-click the **NOTL_DAs** layer and select Open Attribute Table.
11. Scroll to the right to view the joined census data.
12. Close the table window.

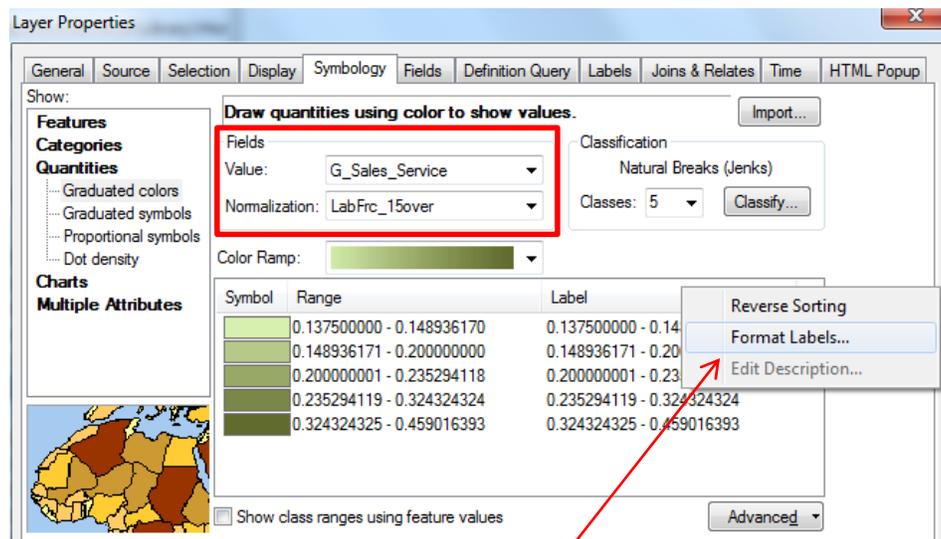
Census Mapping Process

1. Double-click the NOTL_DAs layer and select the Symbology tab.
2. Select **Quantities** then *Graduated Colors*.

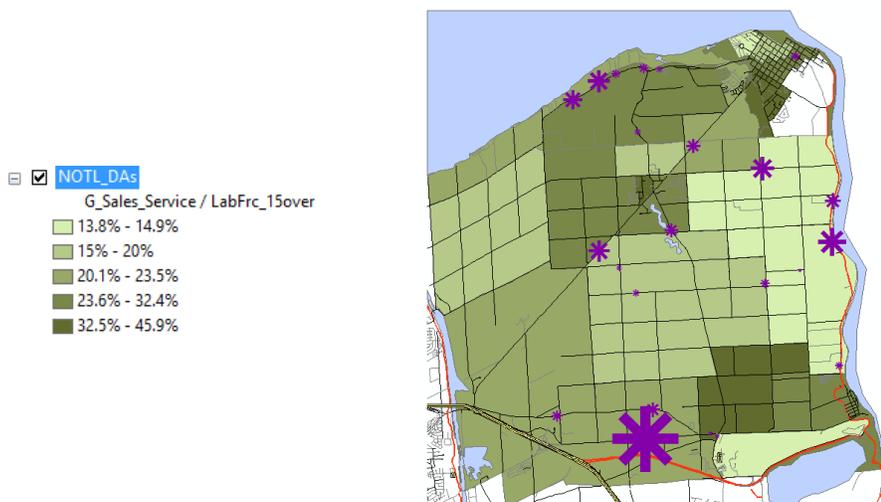
Most census variables are best represented as a percentage of a total population. The **Value** represents the numerator while **Normalization** represents the denominator.

3. From the **Value** dropdown, select *G_Sales_Service*.
4. From the **Normalization** dropdown, select *LabFrc_15over*.
5. Click the **Color Ramp** drop-down, scroll to the very bottom and select the last choice.

These selections will give us a fraction describing the percentage of the *labour force 15 years of age and over* that are employed in *Sales & Service occupations*.



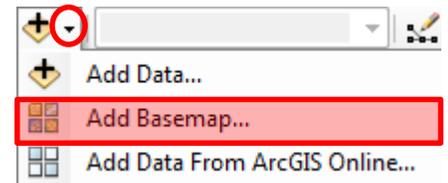
6. To identify the Labels as percentages, click **Label > Format Labels**.
7. Under Category, select Percentage.
8. Select the option "The number represents a fraction. Adjust it to show a percentage".
9. Click the Numeric Options button to adjust the number of decimal places to 1.
10. Click OK to all dialogue boxes to return to the map view.



D. Adding Online Basemaps

A good map should provide the map user with a frame of reference. ArcGIS offers a selection of ready-made base maps for use in ArcGIS.

1. Turn off the water, roads and census layers.
2. Click the little black arrow beside **Add Data** and select **Add Basemap...**
3. Select a basemap and click Add. If prompted to enable Hardware Acceleration, click NO.



Using online basemaps requires a high-speed internet connection and may cause the GIS to run slowly. Be patient!



Virtual Campus recommended courses: Contact maplib@brocku.ca to register

- [Getting Started with GIS](#) (4 hours)
- [Address Geocoding with ArcGIS](#) (3 hours)
- [Getting Started with Cartographic Representations](#) (3 hours)
- [Learn more about Virtual Campus](#)
- [Step-by-step Instructions](#)

Data Sources:

To find data available to the Brock community:

1. <http://www.brocku.ca/maplibrary/digital/digital.php>
2. Contact maplib@brocku.ca to discuss data options.

Data used in this workshop:

- **Dissemination Areas:** Statistics Canada boundary file
- **Census 2006:** Statistics Canada census data acquired from CHASS database
- **Mint Americas statistics:** Revenue data for wineries acquired from MintAmericas database
- **Waterbodies:** DMTI CanMap Water files
- **Roads:** Niagara Vector Data
- **Online Base Maps:** World Street Map (“Streets”)

More about ArcGIS at Brock: <https://brocku.ca/library/collections/MDG/arcgis-at-brock>

ArcGIS 10 Glossary

All definitions taken from the GIS Dictionary on the ESRI support webpage

Geodatabase (.gdb) : A database or file structure used primarily to store, query, and manipulate spatial data. Geodatabases store geometry, a spatial reference system, attributes, and behavioral rules for data. Various types of geographic datasets can be collected within a geodatabase, including feature classes, attribute tables, raster datasets, network datasets, topologies, and many others. Geodatabases can be stored in IBM DB2, IBM Informix, Oracle, Microsoft Access, Microsoft SQL Server, and PostgreSQL relational database management systems, or in a system of files, such as a file geodatabase.

Feature Class: In ArcGIS, a collection of geographic features with the same geometry type (such as point, line, or polygon), the same attributes, and the same spatial reference. Feature classes can be stored in geodatabases, shapefiles, coverages, or other data formats. Feature classes allow homogeneous features to be grouped into a single unit for data storage purposes. For example, highways, primary roads, and secondary roads can be grouped into a line feature class named "roads." In a geodatabase, feature classes can also store annotation and dimensions.

Layer File (.lyr): In ArcGIS, a file with a .lyr extension that stores the path to a source dataset and other layer properties, including symbology.

Nonspatial data: Data without inherently spatial qualities, such as a table of address or census data.

Interchange Format (.e00): A file format that allows the easy exchange of data between different software programs.

Coverage feature class: In ArcInfo, a classification describing the format of geographic features and supporting data in a coverage. Feature classes include point, arc, node, route, route system, section, polygon, and region. One or more coverage features are used to model geographic features; for example, arcs and nodes can be used to model linear features, such as street centerlines. The tic, annotation, link, and boundary feature classes provide supporting data for coverage data management and viewing.

Shapefile (.shp): A vector data storage format for storing the location, shape, and attributes of geographic features. A shapefile is stored in a set of related files and contains one feature class.

Map document (.mxd): In ArcMap, the file that contains one map, its layout, and its associated layers, tables, charts, and reports. Map documents can be printed or embedded in other documents. Map document files have a .mxd extension.

Vector: A coordinate-based data model that represents geographic features as points, lines, and polygons. Each point feature is represented as a single coordinate pair, while line and polygon features are represented as ordered lists of vertices. Attributes are associated with each vector feature, as opposed to a raster data model, which associates attributes with grid cells.



Source:

Esri Support: GIS Dictionary. <http://support.esri.com/en/knowledgebase/GISDictionary/search> Accessed July 20, 2015.