Geocoding Address Data

First, you need to download the dataset for this exercise from out web server at http://www.library.yale.edu/MapColl/beta/files/data/Geocode_Data.zip . Create a folder (use your initials as the name) in a folder where you have write access and unzip the data into that folder.

Geocoding of Address data in ArcGIS requires two data items:

- **Addresses** – Preferably in tabular format. ArcGIS can import *.dbf and *.csv (comma separated values) without much trouble, although *.csv seems to provide the least amount of trouble. Ideally, your data should be collected with geocoding explicitly accounted for at the outset. In this exercise we will be using the *.csv file 'CTNursingHomes.csv' as the dataset to be geocoded. This dataset contains the addresses for 247 nursing homes in Connecticut.

- **Reference Data** – In general, the **Tiger Line Files** created by the U.S. Census provide an easily obtainable reference dataset for geocoding. ESRI provides a convenient set of Tiger Files for download at: http://arcdata.esri.com/data/tiger2000/tiger_download.cfm.

  We will use the installation of StreetMap USA, that has been place on the hard drive of your machines.

Geocoding Your Address Table

1. Open ArcMap with a New Empty Map. Go to **File>Map Properties>Data Source Options** and check **Save Relative Path Names**. Click on **OK** twice and then save your **Map Document** in your working directory as **CTNursingHomesGeocode.mxd.**

2. Using the **Add Data** button , browse to the folder where you downloaded your data and add the following files:

   - **CTNursingHomes.csv**
   - **CTblkgrp.shp**

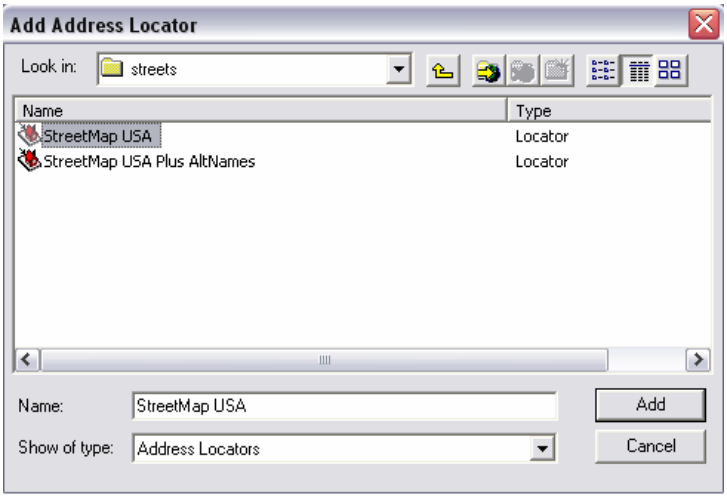
   Notice that your **Table of Contents** has changed from the **Display Tab** to the **Source Tab**. This is because you have added your **CTNursingHomes.csv** file, which does not have any explicit geographic reference.

   First, let's take a look at our address data by right-clicking on the **CTNursingHome.csv** and selecting Open. Notice how the address data has been recorded, with the Street Number and Street Name concatenated into a single field called **ADDRESS**. The file also includes the **City**, **State** and **Zipcode** fields, all of which can improve your geocoding success rate. This is, in general, the best way to organize your address data for use in ArcGIS.

NAME	ADDRESS	CITY	STATE	ZIP	PHONE
ST JOSEPH MANOR	6448 MAIN STREET	TRUMBULL	CT	06611	(203) 268-6204
WINDSOR REHAB & HEALTHCARE CTR	581 POQUONOCK AVE	WINDSOR	CT	06095	(860) 688-7211

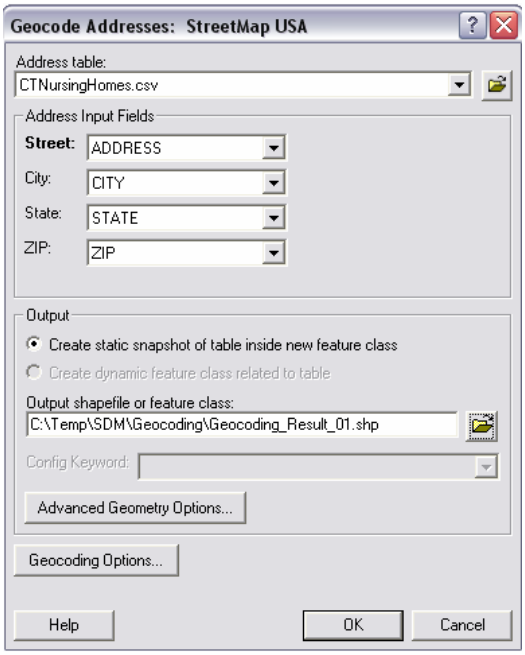
You can **close** your **address table** now.

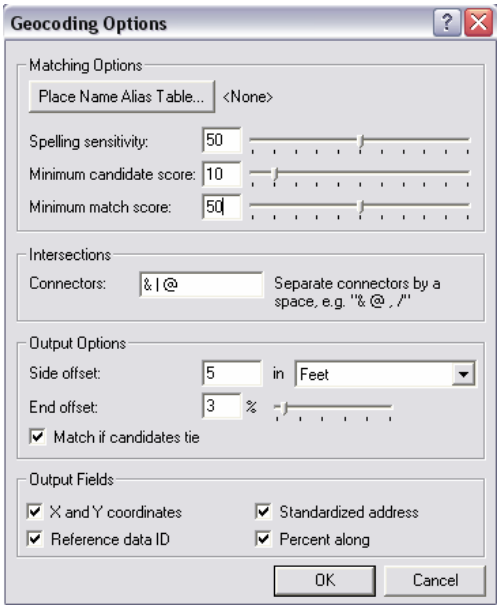
3. **Right-Click** on the **CTNursingHomes.csv** file and **Select Geocode Addresses. Click** the **Add Button** and click on the **Connect to Folder Button** . Browse to the Folder containing the **StreetMap USA Data** and **Click OK** to create a connection to the folder. Now **browse** into the **streetmap_usa\streets** folder and select the **StreetMap USA** file, as shown below, and **click Add**. **Click OK** to bring up the **Geocode Addresses: StreetMap USA Option Dialog**.



4. Use the **Geocode Addresses Option Dialog** to browse to the folder that you want to save your results to and name the file **Connecticut_Geocode_Result01.shp**, or something similarly meaningful.

5. Click on the **Geocoding Options** button at the bottom of the Dialog Box. Set the Options as follows:
   - **Spelling Sensitivity to 50;**
   - **Minimum Match Score to 50;**
   - **Side Offset to 5 feet**
   - **Check All Output Fields Options, if not already**

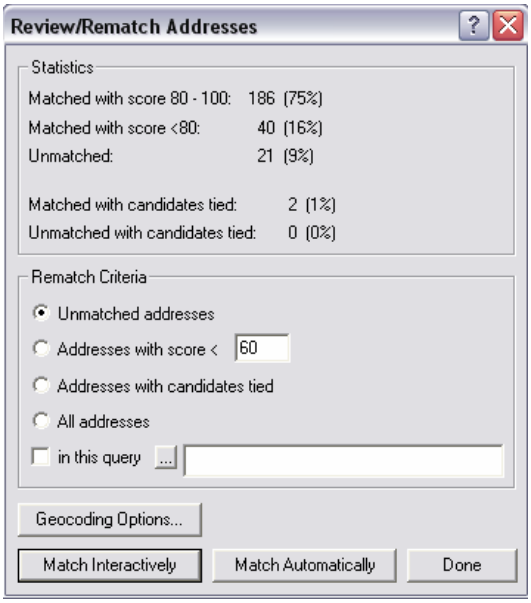




6. **Click OK** in **Geocoding Options**, to apply the changes.

7. **Click OK** in the Geocode Addresses Dialog to start the geocoding process.

8. The **Review/Rematch Addresses Dialog** should become visible once the Geocoding process has been completed. Note how many addresses have been matched.



9. **Click** on the **Geocoding Options** and reduce the **Spelling Sensitivity** and the **Minimum Match Score** to **40**. Click **OK** to return to the **Review/Rematch Addresses Dialog** and Click Match Automatically. You should now have only 5 unmatched addresses listed.

10. Click on the **Match Interactively** button to bring up the **Interactive Review Dialog**. **Highlight** the following address in the list (**78 VIETS ST EXTENSION**). In the **textbox** labeled **Street**, **Delete** the **'Extension'** that follows **'**VIETS ST**'** and click **Search**. Note that the first entry in the results is an acceptable match for our unmatched address. **Highlight** that entry and click **Match**.

11. Highlight the unmatched address (**100 WARREN CIRCLE**). Note that there is a match that works, except for the City Field. Since the Zip Code matches, we will assume that the first candidate is appropriate. **Highlight** it and click **Match**.

12. Now **highlight** the unmatched address (**29 MIDDLE HADDAM RD**). As before, alter the address by **deleting** the **street number** and click **Search**. Note there are no candidate entries returned. This is an address whose location should be further examined or, if appropriate, excluded from our analysis.

13. Finally **highlight** the unmatched address (**25 ROYAL CREST DRIVE**). Note that there are no candidates that are clear matches. This is an address whose location should be further examined or, if appropriate, excluded from our analysis.

14. Click **Close** to exit the **Interactive Review Dialog**. Click **Done** to finish the geocoding process.

15. Note that a new **Layer** has been added to your **Table of Contents** called **Geocoding Result: Connecticut_Geocoding_Result. Right-click** on this new layer and open the attribute table. Note that the attributes from the original address table have been carried over to this new shapefile. **Right-Click** on the **Score fieldname** and select **sort ascending**. This should place the unmatched address at the top of your **attribute table** for examination and verification of the address accuracy through other means.

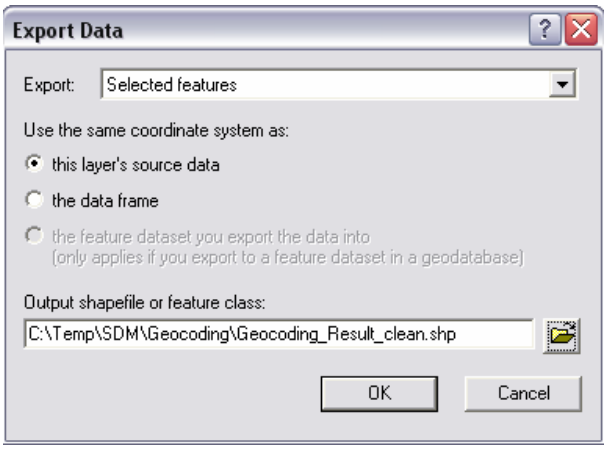
16. We now want to "**select out**" the successful geocodes and **export** them to a **shapefile**. Unsuccessfully geocoded items in our current file will cause problems with certain geoprocessing tasks in ArcGIS because they do not have geometry. **Click and hold** on the small grey box to the left of the first field in your attribute table, **drag** to the box to the left of the

second record, and release. This should select those two records (they will turn bright blue).

17. **Click** on the **Options Button** at the bottom of the attribute table and select "**Switch Selection**." Note that all of your points in the **Map View** window are now selected, as well as their corresponding records in the attribute table. Close the attribute table.

18. **Right-click** on the **Geocoding_Results_01** layer in the **Table of Contents** and select **Data>Export Data.**

19. Since you have an active selection "**Selected Features**" will be the default action for this dialog box. Browse to your data folder and save the new shapefile as **Geocoding_Result_clean.shp**. **Click OK** to export the data. Click **Yes** when prompted to add the new layer to your map.



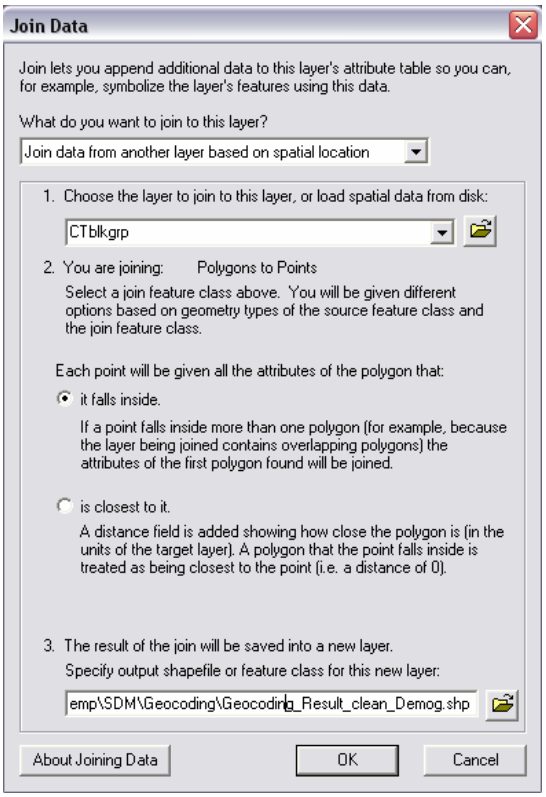
20. You can now turn off the visibility of the original Geocoding_Result_01 layer, or remove it altogether.

21. Save your work.

Joining with Demographic Data

Now suppose that we would like to overlay these addresses with demographic data in order to determine the socioeconomic characteristics of the area that each of these facilities serves.

1. Right-click on the Geocoding_Result_clean layer in the Table of Contents. Select Joins and Relates>Join to open the Join Data Dialog Box.



2. You want to:

   - "**Join data from another layer based on spatial location.**"
   - Join the layer to: "**CTblkgrp.shp**."
   - Give each point the attribute of the polygon "**it falls inside**."
   - Browse to your data folder and save the Output as **Geocode_Results_Demog.shp**

3. Click OK to create the new layer.

4. Right-click on the new layer and open the Attribute Table. Note that each of your Nursing Home records now also contains the Census demographic attributes of its corresponding block group.

5. Save your work and close ArcMap.