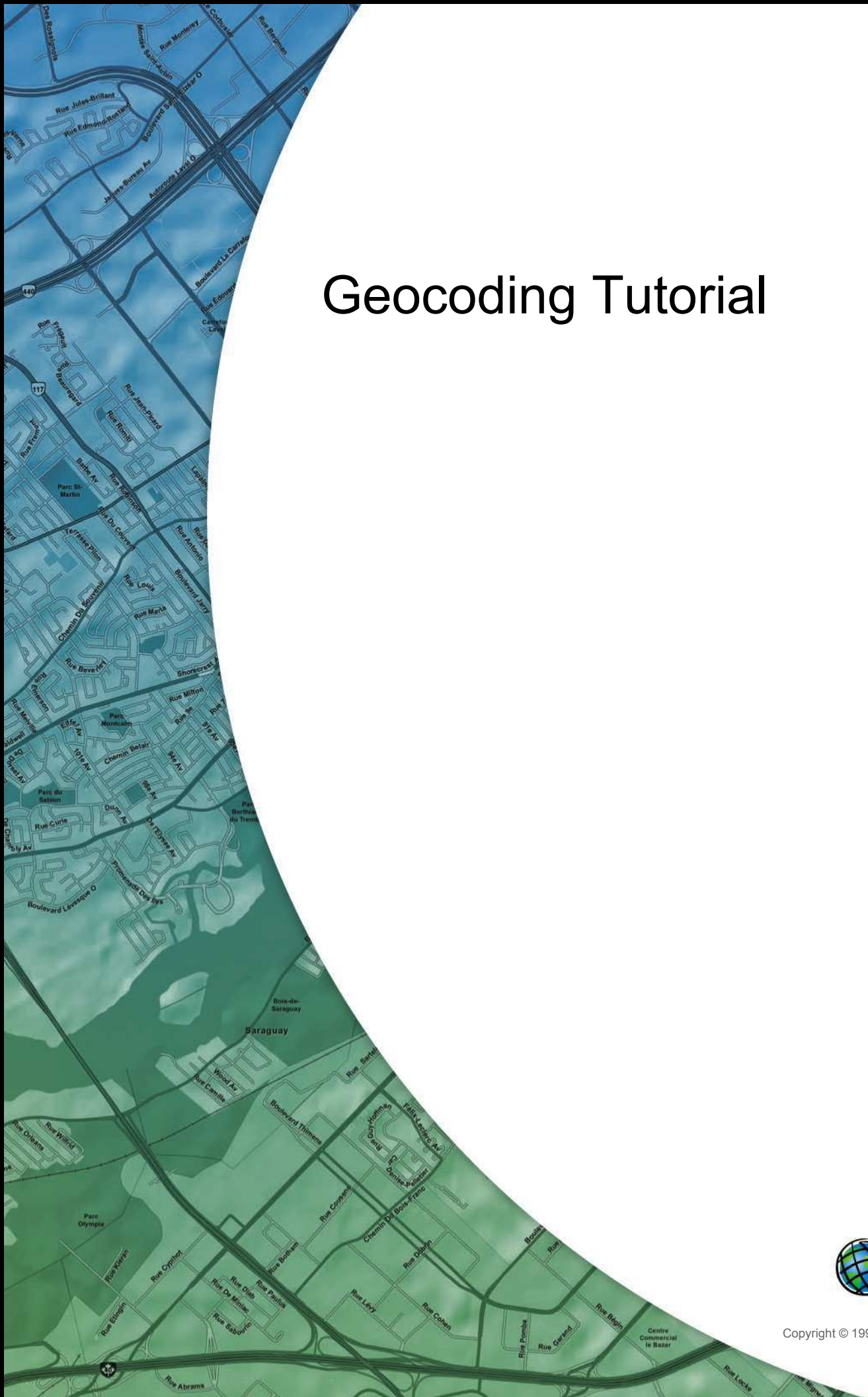


Geocoding Tutorial

Table of Contents

About the Geocoding tutorial

The ArcGIS Geocoding tutorial provides sample data and step-by-step instructions on how to use geocoding functionality for matching addresses. This tutorial introduces you to geocoding with ArcGIS Desktop. You will learn the basic techniques for creating address locators and geocoding with ArcGIS.

Some procedures in this tutorial require that you be familiar with using ArcCatalog and ArcMap. For example, you should know how to copy data to a new location and add data to a map. You should also have a basic understanding of what a geodatabase is and the objects it can contain. If you're new to GIS or feel you need to refresh your knowledge, take some time to read What is ArcMap? and What is ArcCatalog?, or other related topics in ArcGIS Help to help you understand many of these basic concepts.

Tutorial data

Ask your system administrator for the correct path to the tutorial data if you do not find it at the default installation path, C:\ArcGIS\ArcTutor\Geocoding, as specified in the tutorial. Before you begin the exercises, it is recommended that you make a copy of the data used in this tutorial so the original tutorial data will remain unmodified. Copy the Atlanta.gdb folder in the ArcTutor\Geocoding folder to a new location on your computer such as the C drive. The Atlanta.gdb folder contains a file geodatabase named Atlanta. Make sure the geodatabase is not read-only.

In this tutorial

Exercise 1: Creating an address locator

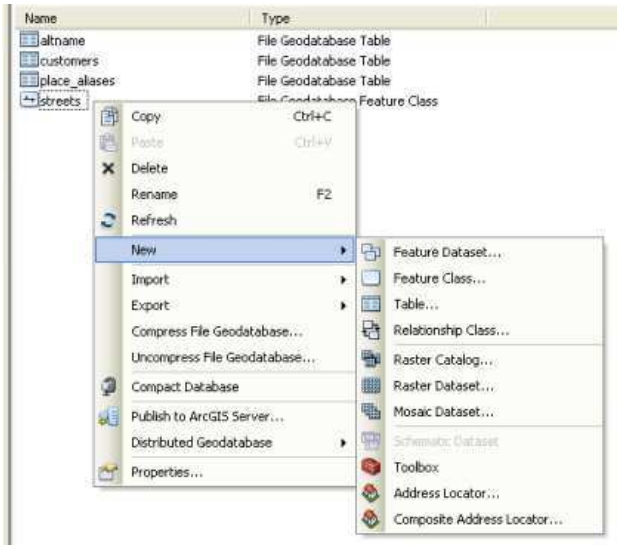
Complexity:
Beginner
Data Requirement:
ArcGIS Tutorial Data Setup
Data Path:
c:\ArcGIS\ArcTutor\Geocoding
Goal:
To create an address locator

In this tutorial you'll learn how to create a new address locator.

An address locator lets you convert textual descriptions of locations into geographic features. Address locators are stored and managed in a workspace you choose. The workspace can be a file folder, file geodatabase, personal geodatabase, or ArcSDE geodatabase. The first thing you'll do is create an address locator based on your copy of the Atlanta file geodatabase.

Steps:

1. Start ArcCatalog by clicking **Start** > **All Programs** > **ArcGIS** > **ArcCatalog 10.**
2. Navigate to the Atlanta file geodatabase.
3. Right-click within the empty space of the **Contents** tab and click **New** > **Address Locator**.

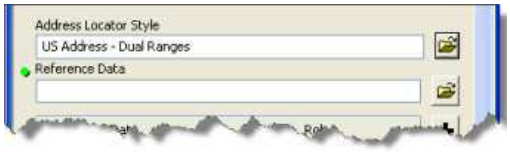


The ***Create Address Locator*** dialog box appears.

4. Click the **Browse** button that is next to the **Address Locator Style** text box to open the ***Select Address Locator Style*** dialog box.

Choose the **US Address—Dual Ranges** address style and click **OK**.

5. Click the **Browse** button that is next to the **Reference Data** text box.



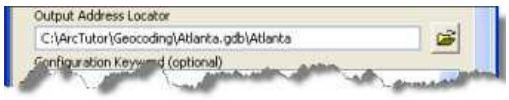
The ***Reference Data*** dialog box appears.

6. Navigate to the Atlanta file geodatabase, choose the **streets** feature class, then click **Add**.
   You can also drag and drop the **streets** feature class from the workspace to the **Reference Data** text box in the dialog box.
7. In the ***Create Address Locator*** dialog box, click the arrow under the **Role** column heading and click **Primary Table**.

8. The **Field Map** section should be completed automatically. If not, choose the appropriate field in the reference data for each address locator field.
   Fields with an asterisk (*) next to their names are required by the address locator style. These fields must be mapped with valid fields in the reference data. Nonrequired fields can be left as <None> if the fields do not apply.

Next, you will set the output path for the locator.

9. Click the **Browse** button that is next to the **Output Address Locator** text box.
   The ***Output Address Locator*** dialog box appears.
10. Navigate to the Atlanta geodatabase folder, type `Atlanta` in the **Name** text box, then click **Save**.
    The output path is displayed in the ***Create Address Locator*** dialog box.



11. Click **OK** to start the process of creating the address locator.

When the process finishes, the new address locator appears in the Atlanta file geodatabase.

Exercise 2: Creating a composite address locator

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
c:\ArcGIS\ArcTutor\Geocoding

Goal:
To create a composite address locator

In this tutorial, you'll learn how to create a new composite address locator.

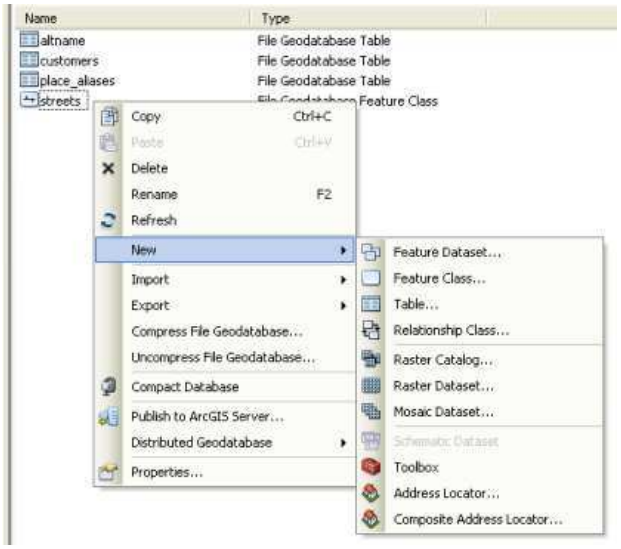
A composite address locator consists of two or more individual address locators that allow addresses to be matched against the multiple address locators and find best matches. For example, a composite address locator may contain a street address locator and a ZIP Code locator. If an address fails to match against the street address locator, the address can fall back to match against the ZIP Code locator.

Like address locators, composite address locators are stored and managed in a workspace you choose. The workspace can be a file folder, file geodatabase, personal geodatabase, or SDE geodatabase. Before you create a composite address locator, you need to find or create the address locators you want to include in the composite address locator.

This tutorial will use the Atlanta address locator you created in exercise 1 and the Postal_US address locator available in the StreetMap data in the Data & Maps DVD. The StreetMap data and address locators should be found in \dm_stmap_dvd\streetmap_na\data.

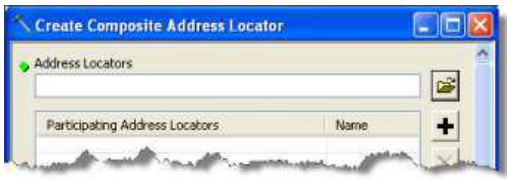
Steps:

1. Start ArcCatalog by clicking **Start** > **All Programs** > **ArcGIS** > **ArcCatalog 10.**
2. Navigate to the Atlanta file geodatabase.
3. Right-click within the empty space of the **Contents** tab, then click **New** > **Composite Address Locator**.



The ***Create Composite Address Locator*** dialog box appears.

4. Click the **Browse** button next to the **Address Locators** text box.



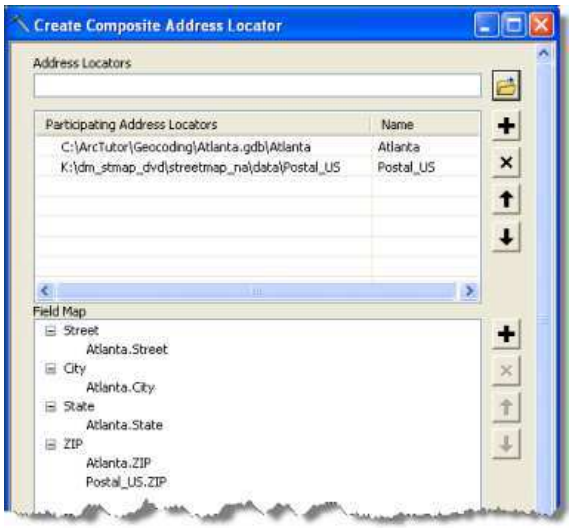
The ***Address Locators*** dialog box appears.

5. Navigate to the Atlanta file geodatabase, select the Atlanta address locator, then click **Add**.

> **Tip:** Instead of using the ***Address Locators*** dialog box, you can drag-and-drop locators from the ***Catalog Tree*** directly into the **Participating Address Locator** section of the ***Create Composite Address Locator*** dialog box.

6. Repeat step 4, navigate to the StreetMap data folder, select the Postal_US address locator, then click **Add**.

The two address locators now appear in the **Participating Address Locators** section. Under the **Name** column, each locator is automatically given a name that the composite address locator refers to. Field mapping for all the participating address locators is also automatically created. The fields become the input fields for the composite address locator.



Changing the **Selection Criteria** section is optional.

7. Make sure the output composite locator will be stored in the Atlanta geodatabase by following the substeps below.
    a. Click the **Browse** button next to the **Output Composite Address Locator** text box. The ***Output Composite Address Locator*** dialog box appears.
    b. Navigate to the folder of the Atlanta geodatabase and click the geodatabase to select it.
    c. Type `Atlanta_Composite` in the **Name** text box.
    d. Click **Save** to accept the changes and close the dialog box.

    The output path appears in the **Output Composite Address Locator** text box.

8. Click **OK** to start creating the composite address locator.
    When the process finishes, the new composite address locator appears in the Atlanta file geodatabase.

Exercise 3: Finding addresses

In this tutorial, you'll learn how to find an address on the ***Geocoding*** toolbar and the ***Find*** dialog box in ArcMap.

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
c:\ArcGIS\ArcTutor\Geocoding

Goal:
To find addresses using the Geocoding toolbar and Find tool

Find an address on the Geocoding toolbar

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**
2. If the ***Geocoding*** toolbar is not visible, click **Customize** > **Toolbars** > **Geocoding** to add it.

A list of default locators, including geocoding services from ArcGIS Online and a Military Grid Reference System (MGRS) locator, have been added to ArcMap. You can use these locators to find addresses or locations.

3. Click the **Catalog window** button on the Standard toolbar to open the Catalog window.
4. Navigate to the geocoding tutorial data folder and drag and drop the streets feature class to the map display.

5. Click the **Manage Address Locators** drop-down arrow on the left side of the **Geocoding** toolbar and click **<Manage Address Locators>**.

The ***Address Locator Manager*** dialog box appears.

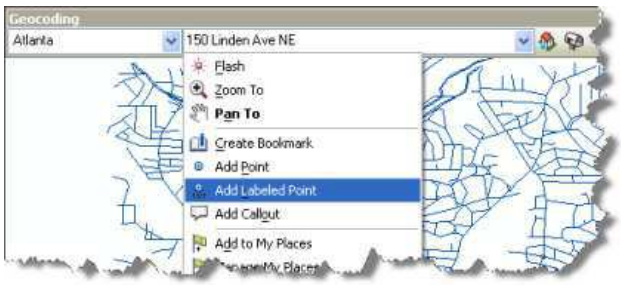
6. In the ***Address Locator Manager*** dialog box, click the **Add** button to open the ***Add Address Locator*** dialog box.
7. Browse to the Atlanta file geodatabase and double-click the Atlanta address locator.
The ***Address Locator Manager*** dialog box closes, and the Atlanta locator is added to the list in the ***Address Locator Manager*** dialog box.

Tip: Instead of using the ***Address Locator Manager*** to add a locator to ArcMap, you can click and drag a locator from the **Catalog** window and drop it in the map area or **Table of Contents**.

8. Click the **<Type an address...>** text box, type `150 Linden Ave NE`, then press ENTER.

A ToolTip appears showing the full address returned by the locator, and the point location on the map flashes.

9. Right-click the address on the ***Geocoding*** toolbar and click **Add Labeled Point** to add the graphic point and its label to the map.



10. Type `100 feet NW from 150 Linden Ave NE` in the **Address Input** text box and press ENTER. Then, right-click the address and add it to the map as a labeled point.

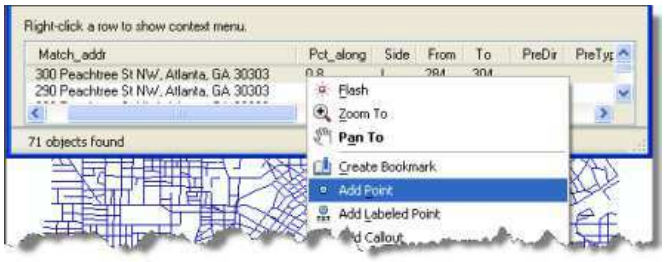
Address locators created in the current version of ArcGIS support finding an address based on a spatial offset. The spatial offset can be presented as `100 feet NW from [an address]` or in any other distance, linear unit, and direction from the address. Instead of specifying a direction, you can enter a bearing degree, for example, `200 yards bearing 70 from [an address]`.

Take a moment to select one of the default locators from the ***Geocoding*** toolbar and search for addresses that you know.

Find an address in the Find dialog box

Steps:

1. Click the **Find** button on the ***Tools*** toolbar.
2. In the ***Find*** dialog box that appears, click the **Locations** tab.
3. Click the **Choose a locator** drop-down list and click Atlanta.
4. Type `300 Peachtree St NE 30303` in the **Full Address** text box and press ENTER, or click **Find** to search for candidates.
   Found candidates ranked by score are shown at the bottom of the dialog box. You can see more candidates by checking the **Show all candidates** check box.
5. Right-click the first candidate in the list and click **Add Point** in the context menu.



   A graphic point representing the location of the address appears on the map.

   Optionally, select one of the default locators from the **Choose a locator** drop-down list and search for any addresses you know.

6. Click **Cancel** to close the ***Find*** dialog box.

Exercise 4: Geocoding addresses in a table and rematching unmatched addresses

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
c:\ArcGIS\ArcTutor\Geocoding

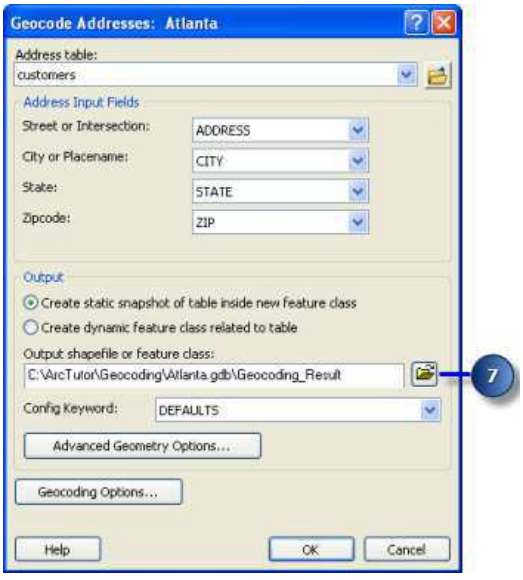
Goal:
To geocode a table of addresses and rematch the geocoded feature class

Geocoding addresses in a table

If you have a table that contains address information, you can geocode all the addresses at once. In this exercise, you will begin with a table containing the addresses of customers and geocode the entire table, showing where the customers are located.

Steps:

1. Open a new map document in ArcMap. You do not need to save the map you created in the previous task.
2. Add the Streets feature class and the customers table from your copy of the Atlanta geodatabase to your map.
3. Right-click the customers table on the **List by Source** view of the **Table of Contents** and click **Geocode Addresses** in the context menu.
4. Click **Add** in the ***Choose an address locator to use*** dialog box.
   The ***Add Address Locator*** dialog box opens.
5. Navigate to the Atlanta geodatabase, click the Atlanta address locator, then click **Add**. Click **OK**.
6. Click **OK**.
   The ***Geocode Addresses: Atlanta*** dialog box appears.
7. In the **Output** section, click the **Browse** button to define the output feature class.



The ***Saving Data*** dialog box appears.

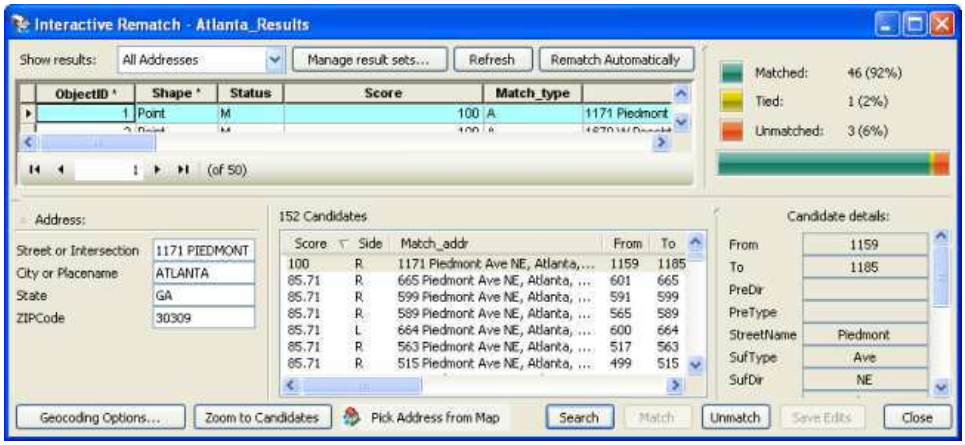
8. Click the **Save as type** drop-down arrow, then click **File and Personal Geodatabase feature classes**.
9. Navigate to your copy of the Atlanta geodatabase, then double-click the geodatabase. In the **Name** text box, type `Atlanta_Results`.
10. Click **Save**.
    A new point feature class named `Atlanta_Results` will be created in the Atlanta geodatabase. The point features generated by the geocoding process will be saved in the feature class.
11. Click **OK** to start geocoding.
    The ***Geocoding Addresses*** dialog box is displayed showing the matching statistics and the progress bar for the matching process.

    When the geocoding process is finished, the ***Geocoding Addresses*** dialog box shows the final statistics of the addresses that were matched or not matched. In this tutorial, three addresses fail to match and one address is tied. You'll rematch the unmatched addresses later in the tutorial.
12. Click **Close** to close the ***Geocoding Addresses*** dialog box.
    A **Geocoding Result** layer is added to the map. It shows the points that were added to the Atlanta_Results feature class.

Rematching addresses

Steps:

1. Select the Geocoding Result: Atlanta_Results layer in the **Table of Contents** and click the **Review/Rematch Addresses** button on the **Geocoding** toolbar.
   The ***Interactive Rematch*** dialog box opens.



2. The ***Interactive Rematch*** dialog box may display all the records in the geocoded feature class at the top of the dialog box. In this exercise, there are three addresses that were not matched. To rematch the unmatched address records, click the **Show results** drop-down arrow and click **Unmatched Addresses**. The result will show three records, and the first one is automatically selected. Sometimes, an address is not matched because a perfect match cannot be found, but

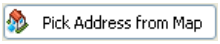
there are close match candidates. The candidates are listed in the **Candidates** section of the dialog box.

3. Arrange the ***ArcMap*** window and the ***Interactive Rematch*** dialog box so you can see the map. Near the center of the map, you will notice a few points that are highlighted: one in yellow and the others in cyan. These are the locations of the candidates listed in the bottom window of the ***Interactive Rematch*** dialog box. The selected candidate is highlighted in yellow on the map.
4. Click the **Zoom In** button on the ***Tools*** toolbar and drag over the area of the candidates to zoom in on them.
5. Click the fourth candidate in the candidate list. The location of the yellow highlighted candidate changes on the map.
6. Click the **Match** button in the bottom of the dialog box. The selected address is now associated with the fourth candidate in the list at the bottom and the **Status** field is changed from U to M. The list of unmatched addresses is updated.

Rematching addresses by picking a point location on the map

Steps:

1. The result set shows two addresses that were not matched.
2. Arrange the ***ArcMap*** window and the ***Interactive Rematch*** dialog box so you can see the map.
3. Click the **Zoom In** tool and drag over an area of the map.

   Next, you will use **Pick Address from Map** to match an unmatched address. You can use this tool to match or rematch an address when you know where it should be located on the map.
4. Click the **Pick Address from Map** button 

in the ***Interactive Rematch*** dialog box.
   Now when you point the mouse cursor on the map, it shows a cross with a blue dot in the center.
5. Click and hold the mouse button along a street segment to display the nearest qualifying address in a ToolTip box.
6. Place the mouse pointer on the location you want the address to be matched to.
7. Right-click the location and click **Pick Address** from the context menu.

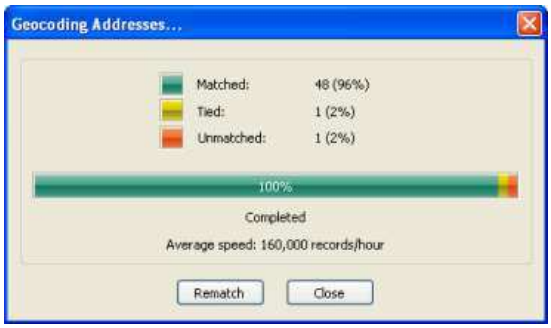
   The unmatched address is now matched to the point location you just picked.
8. Click **Close** to close the ***Interactive Rematch*** dialog box.

Geocoding addresses using a composite address locator

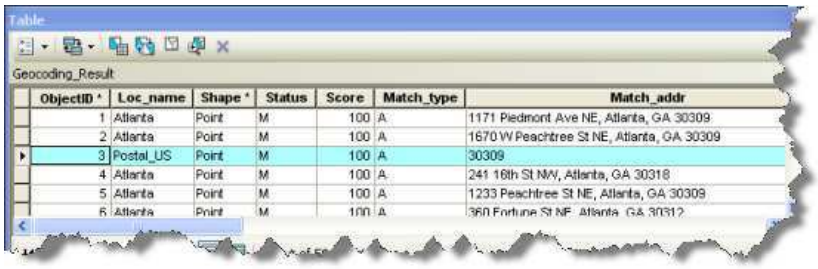
In this exercise, the customers address table is geocoded against the composite address locator you created in exercise 2. It shows how addresses are matched against multiple address locators to find best matches.

Steps:

1. Right-click the customers table on the **List by Source** view of the table of contents and click **Geocode Addresses**.
2. Click **Add** in the ***Choose an address locator to use*** dialog box.
   The ***Add Address Locator*** dialog box opens.
3. In the ***Add Address Locator*** dialog box, navigate to the Atlanta geodatabase, click the **Atlanta_Composite** composite address locator, then click **Add** to close the ***Add Address Locator*** dialog box.
4. Click **OK** to close the ***Choose an address locator to use*** dialog box.
   The ***Geocode Addresses: Atlanta_Composite*** dialog box opens.
5. In the **Output** section, edit the path to the Atlanta geodatabase and change the result feature class name to `Composite_Results`.
6. Click **OK** to start geocoding.
   The ***Geocoding Addresses*** dialog box is displayed showing the matching statistics and the progress bar for the matching process.



   You can see that only one address is not matched.
7. Click **Close**.
   The ***Geocoding Addresses*** dialog box closes, and a **Geocoding Result** layer is added to the map. The layer shows the points that were added to the Composite_Results feature class.
8. Right-click the **Composite_Results** layer and click **Open Attribute Table**.
   You can see that the name of the participating address locator used to match the address is shown in the **Loc_name** field of the attribute table. Some addresses that failed to match against the Atlanta address locator were instead matched by ZIP Code against the Postal_US locator.



ObjectID *	Loc_name	Shape *	Status	Score	Match_type	Match_addr
1	Atlanta	Point	M	100	A	1171 Piedmont Ave NE, Atlanta, GA 30309
2	Atlanta	Point	M	100	A	1670 W Peachtree St NE, Atlanta, GA 30309
3	Postal_US	Point	M	100	A	30309
4	Atlanta	Point	M	100	A	241 16th St NW, Atlanta, GA 30318
5	Atlanta	Point	M	100	A	1233 Peachtree St NE, Atlanta, GA 30309
6	Atlanta	Point	M	100	A	360 Fortune St NE, Atlanta, GA 30312

9. Close ArcMap. You do not need to save the map document.

Exercise 5: Using alternate street name and place-name aliases

When you create an address locator, you have the option to use alternate names and place-name aliases. Place-name aliases let you associate names of well-known places with street addresses—for example, the names of museums, hospitals, or landmarks. When geocoding an address, the place-name alias table is consulted first. If a place-name is found, the street address from the place-name alias table is geocoded. Similarly, alternate names can be defined for features, such as streets, in the reference data. When geocoding an address, the alternate name table is also searched to find potential candidates where streets have more than one name.

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
C:\ArcGIS\ArcTutor\Geocoding

Goal:
Create an address locator using alternate name and place-name aliases and find locations using those aliases.

Creating an address locator that uses alternate names and place-name aliases

In this task, you'll create a new address locator that uses alternate street names and place-name aliases, then use it in ArcMap to find addresses.

Steps:

1. In ArcCatalog, navigate to the Atlanta geodatabase.
2. Right-click within the empty space of the **Contents** tab and click **New** > **Address Locator**. The ***Create Address Locator*** dialog box appears.
3. In the ***Create Address Locator*** dialog box, click the **Browse** button that is next to the **Address Locator Style** text box.

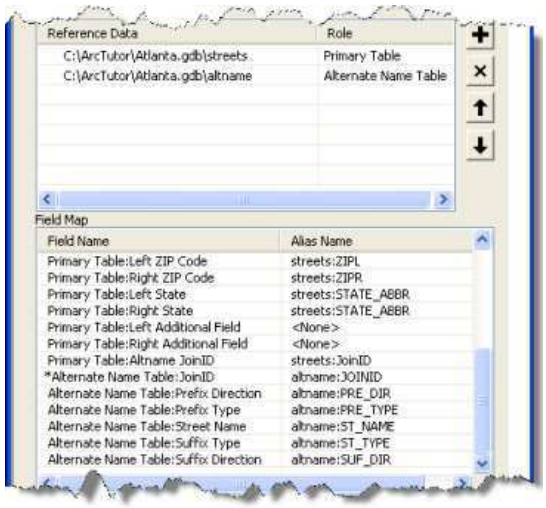
The ***Select Address Locator Style*** dialog box appears.

4. Choose the **US Address—Dual Ranges** address style.

5. Click **OK**.
6. Click the **Browse** button that is next to the **Reference Data** text box to open the ***Reference Data*** dialog box.

7. Browse to the Atlanta file geodatabase, choose the streets feature class, then click **Add**.
8. In the ***Create Address Locator*** dialog box, click the arrow under the **Role** column heading and choose **Primary Table**.

9. Repeat steps 6 and 7, but this time browse to and add the altname table in the Atlanta geodatabase.
10. Click the arrow under the **Role** column heading for the altname table and choose **Alternate Name Table**.
11. The **Field Map** section should be completed automatically. If not, select the appropriate field in the reference data for each field. It is essential that the JoinID fields for the Primary Table and Alternate Name Table are mapped properly; if they aren't, follow these substeps:
    a. Click the arrow under the **Alias Name** column heading for the **Primary Table:Altname JoinID** field and choose **streets:JOINID**.
    b. Click the arrow for the **Alternate Name Table:JoinID** field and choose **altname:JOINID**.



    The JOINID field in the altname table and the JOINID field in the streets feature class are used to relate the records in the altname table to the records in the streets feature class.
12. Repeat steps 6 and 7, but this time browse to and add the place_aliases table in the Atlanta geodatabase.
13. Click the arrow under the **Role** column heading for the place_aliases table and choose **Alias Table**.

14. The field mapping for the place_aliases table should be completed automatically. If not, select the appropriate field in the reference data for each address locator field. For the field named **Alias Table:Alias**, click the arrow under the **Alias Name** column heading and choose **place_aliases:NAME**. This is the field that contains the names of the places that you can use to geocode.

Next, you'll set the path for the output address locator.

15. Click the **Browse** button that is next to the **Output Address Locator** text box.
The ***Output Address Locator*** dialog box appears.
16. Navigate to the folder of the Atlanta geodatabase, type `Atlanta_AltName` as the address locator name, then click **Save** to accept the change and close the dialog box.
17. Click **OK** to start the process of creating the address locator.
When the process finishes, the new Atlanta_AltName address locator appears in the Atlanta file geodatabase.
18. Close ArcCatalog.

You can now use this address locator to find where an address is located on a map.

Finding locations using alternate street names and place-name aliases

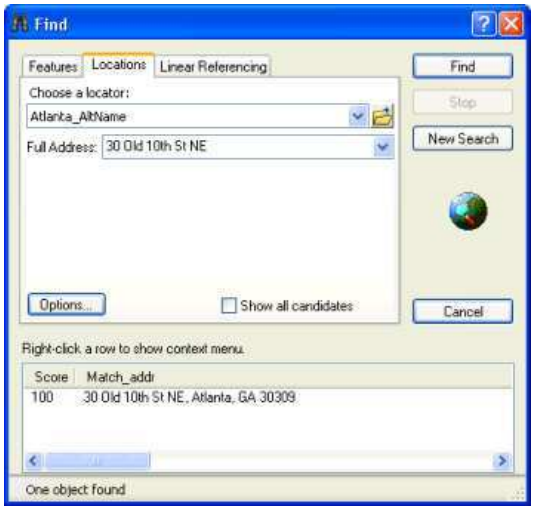
In this task, you'll use the Atlanta_AltName locator you just created to find addresses.

Steps:

1. Open a new map document in ArcMap.
2. Add the streets feature class from the Atlanta geodatabase to your map.
3. Click the **Find** button on the ***Tools*** toolbar.
4. In the ***Find*** dialog box, click the **Locations** tab.
5. Click the **Browse** button that is next to the **Choose an address locator** drop-down box.
The ***Add Locator*** dialog box opens.
6. Browse to the Atlanta file geodatabase, choose the Atlanta_AltName locator, then click **Add**.

A street may have more than one name. For example, Atlanta Blvd is an alternate name for Old 10th St NE in the Atlanta database. With the Atlanta_AltName address locator, 30 Old 10th St NE and 30 Atlanta Blvd will both find the same location.

7. Type `30 Old 10th St NE` in the **Full Address** text box and click **Find** to search for candidates.



8. Right-click the candidate in the candidate list and click **Add Point**.
   A graphic point representing the address' location appears on the map.
9. Type `30 Atlanta Blvd` in the **Full Address** text box and click **Find** to search for candidates.
10. Right-click the found candidate and click **Flash**.
    You can see that both addresses are matched to the same location on the map.

    In addition to geocoding addresses, you can also geocode place-names that have been defined in the place_aliases table.

11. Type `Atlanta Market` in the **Full Address** text box and click **Find** to search for candidates.
12. Right-click the first found candidate and click **Add Point**.
    The location of the hospital appears on the map as if you had typed its complete address.
13. Click **Cancel** to close the ***Find*** dialog box.

Creating locators that use alternate names and place-name aliases is beneficial for people who know a landmark's name but not its address. It also helps in situations where a street or feature has more than one name.