

Intermediate Geocoding Part 1

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URP6275

Module 5 – Part 2-1

[https://adhoc.geoplan.ufl.edu/downloads/
Geocoding_20190207/](https://adhoc.geoplan.ufl.edu/downloads/Geocoding_20190207/)

Intermediate Geocoding Part 1

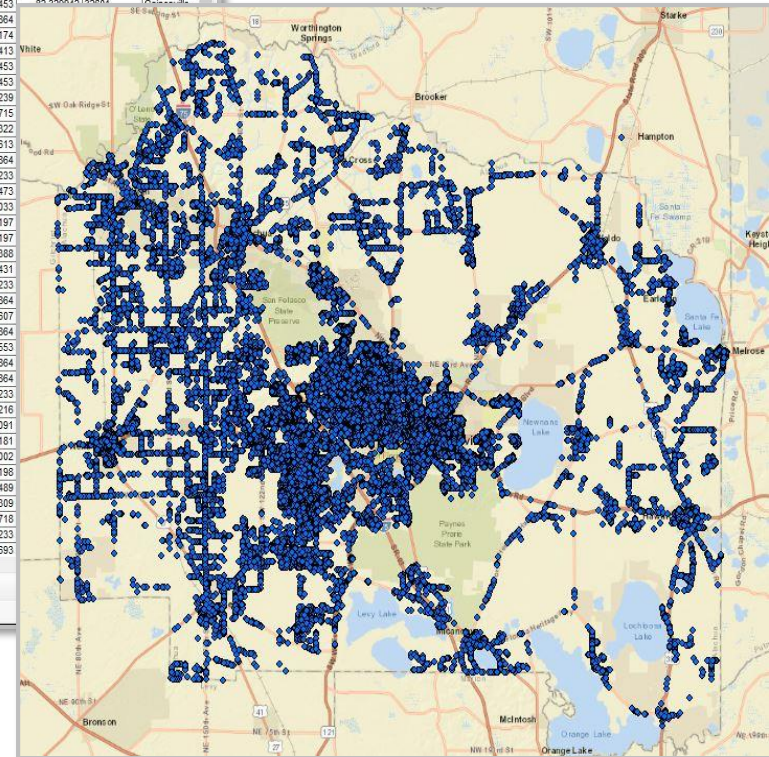
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Geocoding – What's the Point?

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VoteRegistration.txt - Notepad
File Edit Format View Help

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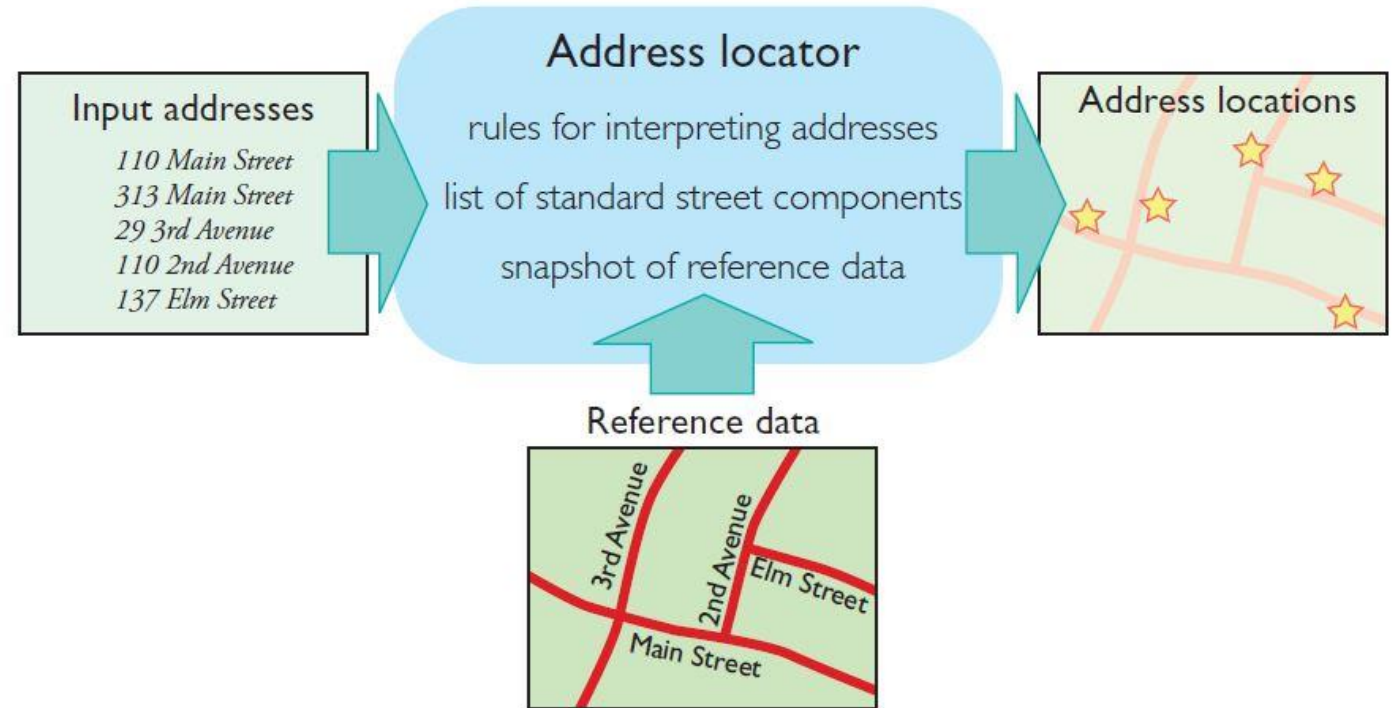
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1126 NW 10Th Ave	1126	NW	10Th Ave	Ave	29.661197	-82.321551	32601	Gainesville
710 SW Depot Ave APT 229	710	SW	Depot Ave	Ave	29.643388	-82.321551	32601	Gainesville
315 NW 7Th Ter	315	NW	7Th Ter	Ter	29.65431	-82.321551	32601	Gainesville
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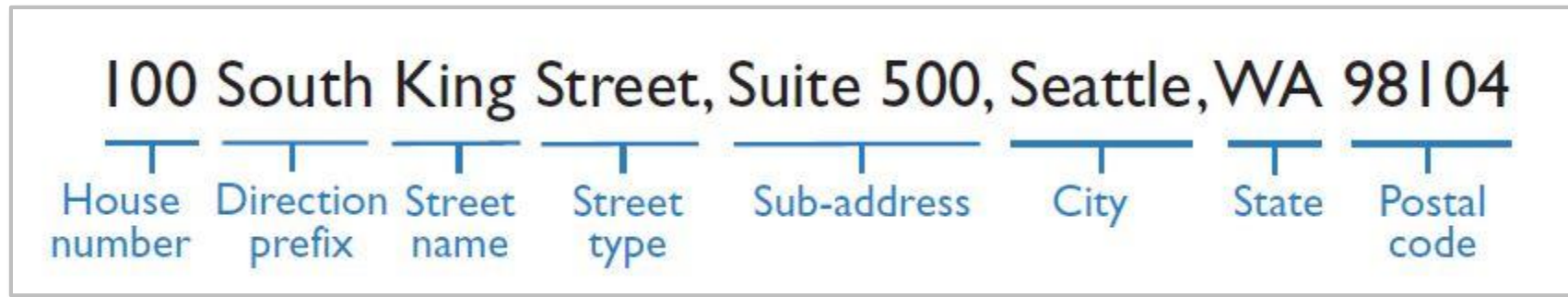
84 (0 out of 179009 Selected)

What is Geocoding?

- * Geocoding is the term used to describe the act of address matching.
- * Geocoding is the process of finding a geographic location (x, y point) for an address on a map.
 - * Such as street number and name, city, state, and ZIP Code.
- * Geocoding allows you to go from a list of addresses in a flat table file to a map.

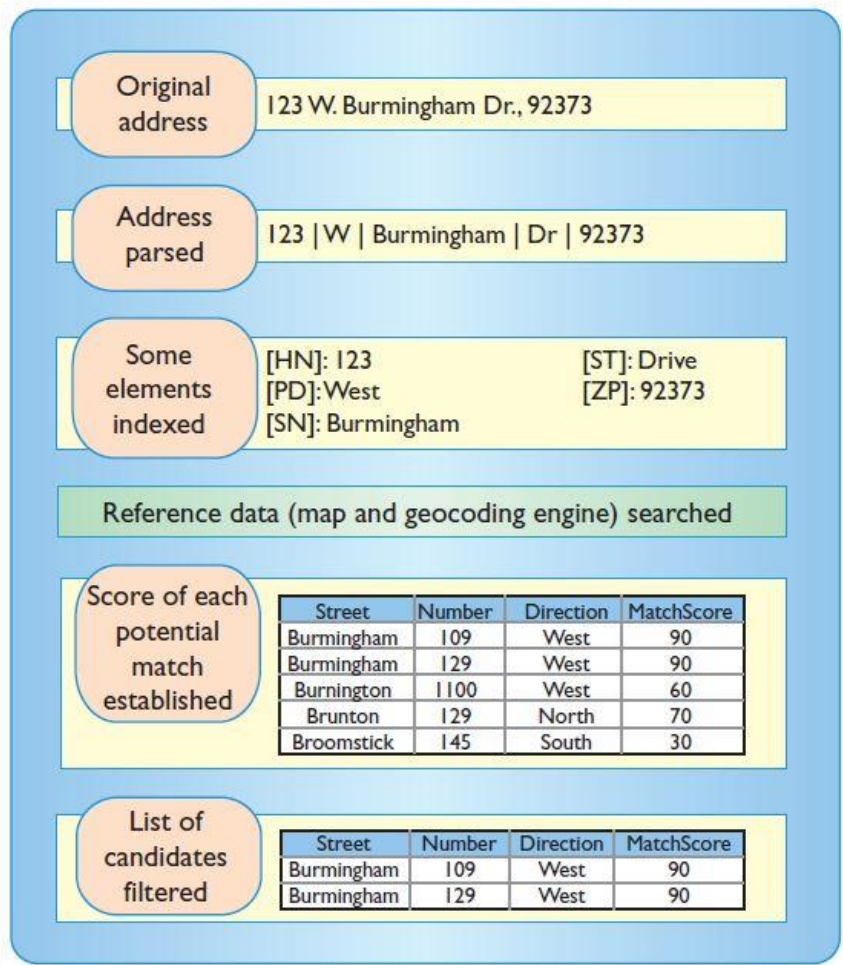


Common U.S. Address Elements



Geocoding is based off the typical address scheme for the US, in which one side of the street contains even house numbers while the other side of the street contains odd house numbers.

How Address Matching Works



- The geocoding process uses an algorithm to find the geographic location of addresses.
- First, a street segment is identified using the zip code and street name.
- Next, the geographic location of the address is matched using the building number to determine how far down the street and on which side of the street the building is located.

Geocoding Accuracy

The locational accuracy of geocoded addresses may vary from urban to rural areas due to the algorithm used to generate the geographic locations of addresses

- * Algorithm assumes equal size of parcels along a road route (aka evenly distributed).
 - * For Example, Rural parcel sizes ranging from 2.5 ac to 15 ac along a route
- * Geocoded addresses in urban areas are usually more reliable than those in rural areas.

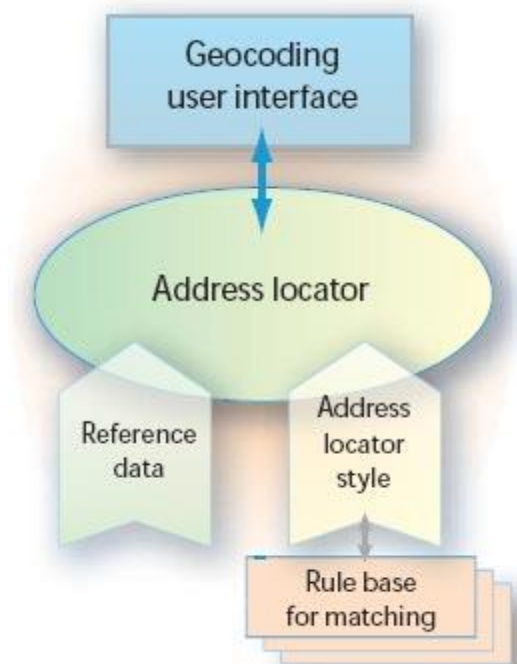


Address Matching

Reference Data & Locator Creation

The Geocoding Process (address matching) requires a series of steps:

- * Build or Acquire Reference Data
 - * For example, street networks, parcel centroids or zip code polygons.
- * Standardize Reference Data Addresses
 - * Parse out each address element to it's own field or fields.
- * Select an Address Locator Style
 - * Format of the input addresses is the driving factor.
- * Build an Address Locator
 1. Selecting an address locator style
 2. Loading reference data from one or more feature classes.
- * Perform address matching




Common Address Locator Styles

1. U.S. Address – Dual Ranges
2. U.S. Address – One Range
3. U.S. Address – Single House
4. U.S. Address – Zip 5-Digit
5. Gazetteer
6. Single Field


Common address locator styles for the United States	Address data in the input table	Reference data address fields	Map of reference data with sample matched address
<p>U.S. Address—Dual Ranges</p> <p><i>Finds input addresses with house number, street, and zone on reference data containing street centerline segments with from- and to-address ranges on the right and left side. This locator can place an address point on the correct side of the street. By default, addresses are placed at a 20-foot offset on the left or right side of the street.</i></p>	<p><i>All address elements are contained in a single field in the input table.</i></p> <p><i>Examples are</i> 320 Madison St. N2W1700 County Rd 105-30 Union St</p>	<p>House From Left House To Left House From Right House To Right Prefix Direction Prefix Type Street Name Street Type Suffix Direction Left Zone Right Zone</p>	
<p>U.S. Address—One Range</p> <p><i>Similar to the U.S. Streets and Zone address locator style, but works with street centerlines with from- and to-address ranges, without information about right and left sides. Addresses are located along the street centerline.</i></p>	<p><i>All address elements are contained in a single field in the input table.</i></p> <p><i>Examples are</i> 2 Summit Rd. NS200 County Rd PP 115-19 Post St.</p>	<p>House From House To Prefix Direction Prefix Type Street Name Street Type Suffix Direction Zone</p>	
<p>U.S. Address—Single House</p> <p><i>Finds input addresses with street and zone fields on reference data where each feature represents one address. The reference data can be points, such as building or parcel centroids, or polygons, such as parcels and buildings.</i></p>	<p><i>All address elements are contained in a single field in the input table.</i></p> <p><i>Examples are</i> 71 Cherry Ln. W1700 Rock Rd. 38-76 Carson Rd.</p>	<p>House Number Prefix Direction Prefix Type Street Name Street Type Suffix Direction Zone</p>	
<p>U.S. Address—ZIP 5-Digit</p> <p><i>Finds input addresses consisting of a 5-digit ZIP Code (postal code in the US). The reference data can contain points or polygons with ZIP Code values. If the reference data contains polygons, then the ZIP location is placed at the centroid of the ZIP Code polygon.</i></p>	<p><i>Five-digit ZIP Code values are contained in a single field in the input table.</i></p> <p><i>Examples are</i> 90210 87506 87112</p>	<p>ZIP Code</p>	
<p>Gazetteer</p> <p><i>Finds places such as mountains, bridges, rivers, and cities by feature names and geographic zone such as city, state, and country. The reference data represent places with either points or polygons and has fields for the place and geographical zone.</i></p>	<p><i>All place name elements are contained in a single field in the input table.</i></p> <p><i>Examples are</i> Leeds Castle, England Sapporo, Japan</p>	<p>Place City State Country</p>	
<p>Single Field</p> <p><i>Finds input addresses consisting of a user-defined key field, usually a place name or landmark. The reference data can contain points or polygons with a key field with values that match the input address key field.</i></p>	<p><i>Features are identified by a text string, name, or code in a single field in the input table.</i></p> <p><i>Examples are</i> Cafe Cabrillo N1N115</p>	<p>Key field</p> <p>Note: A reference data field with light font style indicates that this field is optional.</p>	

U.S. Address: Dual Ranges

Common address locator styles for the United States	Address data in the input table	Reference data address fields	Map of reference data with sample matched address
<p>U.S.Address—Dual Ranges</p> <p><i>Finds input addresses with house number, street, and zone on reference data containing street centerline segments with from- and to-address ranges on the right and left side. This locator can place an address point on the correct side of the street. By default, addresses are placed at a 20-foot offset on the left or right side of the street.</i></p>	<p><i>All address elements are contained in a single field in the input table.</i></p> <p><i>Examples are</i> 320 Madison St. N2W1700 County Rd 105-30 Union St</p>	<p>House From Left House To Left House From Right House To Right Prefix Direction Prefix Type Street Name Street Type Suffix Direction Left Zone Right Zone</p>	 <p>A map showing a street segment with a red line. The street is labeled '347 Garcia Road'. The map shows the street's path, including a curve to the right. Address ranges are indicated by numbers: 300 and 301 on the left side, and 359 and 360 on the right side. A blue dot is placed on the street segment between 347 and 359, representing a matched address point.</p>

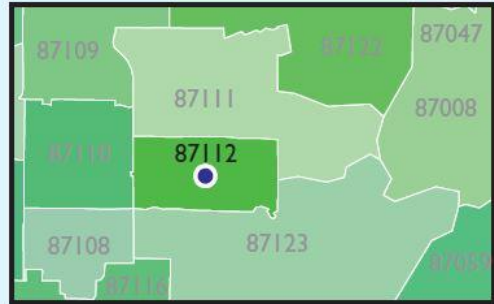
✓ Most commonly used address locator.

U.S. Address: Single House

Common address locator styles for the United States	Address data in the input table	Reference data address fields	Map of reference data with sample matched address
<p>U.S.Address—Single House</p> <p><i>Finds input addresses with street and zone fields on reference data where each feature represents one address. The reference data can be points, such as building or parcel centroids, or polygons, such as parcels and buildings.</i></p>	<p><i>All address elements are contained in a single field in the input table.</i></p> <p><i>Examples are</i> 71 Cherry Ln. W1700 Rock Rd. 38-76 Carson Rd.</p>	<p>House Number Prefix Direction Prefix Type Street Name Street Type Suffix Direction Zone</p>	 <p>A map showing a residential area with a blue dot indicating a matched address. The address is labeled as '134 Camino Alire'.</p>

- ✓ Often used in address locators derived from parcel centroids.

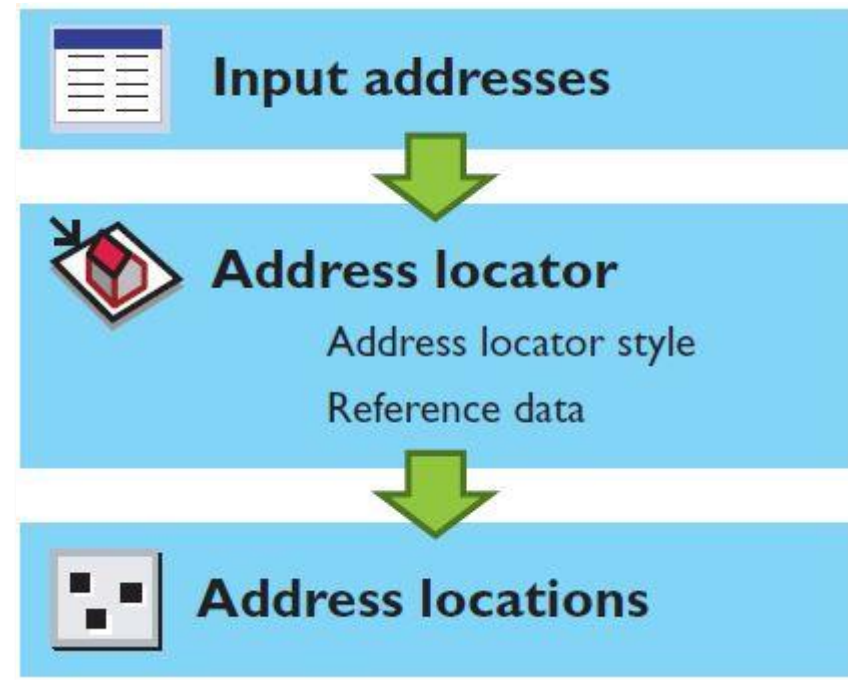
U.S. Address: Zip 5 Digit

Common address locator styles for the United States	Address data in the input table	Reference data address fields	Map of reference data with sample matched address
<p>U.S.Address—ZIP 5-Digit</p> <p><i>Finds input addresses consisting of a 5-digit ZIP Code (postal code in the US). The reference data can contain points or polygons with ZIP Code values. If the reference data contains polygons, then the ZIP location is placed at the centroid of the ZIP Code polygon.</i></p>	<p><i>Five-digit ZIP Code values are contained in a single field in the input table.</i></p> <p><i>Examples are</i></p> <p>90210 87506 87112</p>	ZIP Code	

✓ Less refined, obscures sensitive data.

ArcMap Geocoding Steps

1. Add an Address Locator
2. Geocode Addresses
3. Rematch Addresses



Add an Address Locator

I Add an address locator

Add one or more address locators to an ArcMap document



Address locator **AddressPoint**



Geocode Addresses

2 Geocode addresses

Select an address locator

Select an address table and address field

Specify an output feature class for match points

Set geocoding options

- Spelling sensitivity
- Minimum candidate score
- Minimum match score

Set output options such as side and end offsets

Select output fields such as x, y coordinates and reference ID

AddressField
2006 Calle de Sebastian
2010 Conejo Dr
2001 Ft Union Drive
612 Calle do Leon
2115 Calle de Sebastian
504 Calle de Valdez
612 Calle del Valdes
2017 Valley Rio



Rematch Addresses

3 Rematch addresses

Refine address matches by

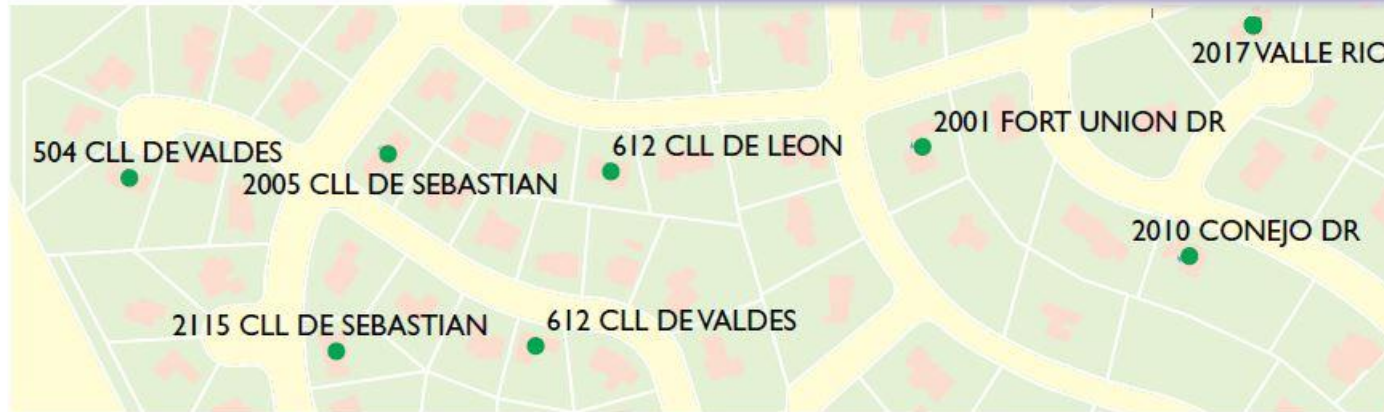
- Adjusting spelling sensitivity
- Adjusting score values
- Correcting spelling errors
- Choosing tie matches on the map
- Picking address from the map

The geocoding result table shows both input and matched addresses with score values

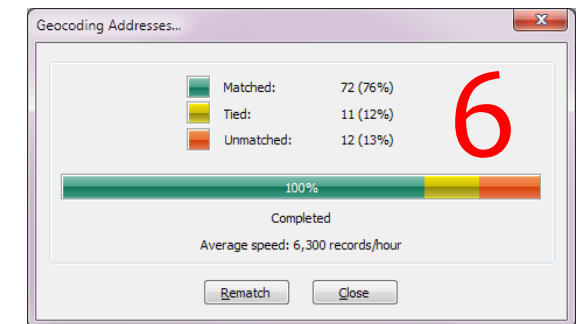
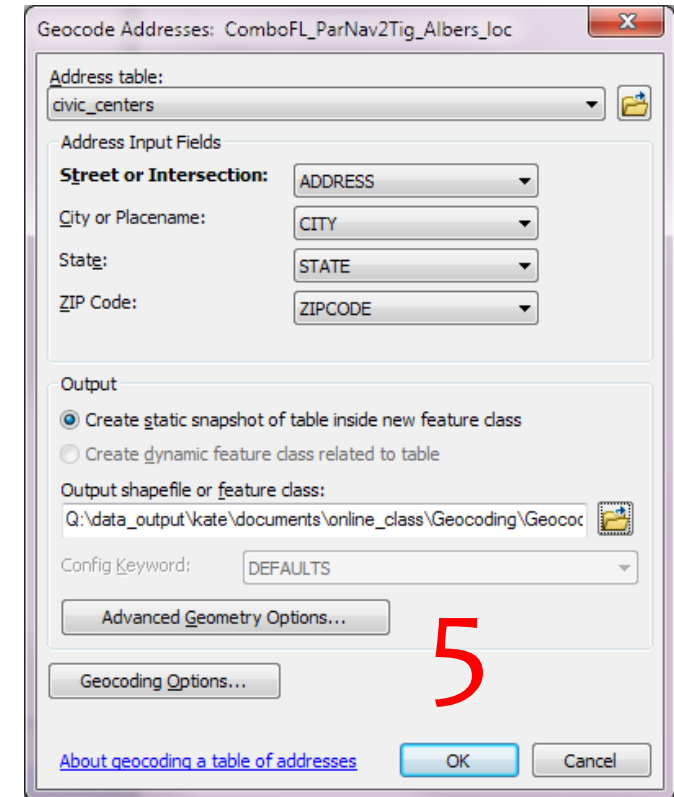
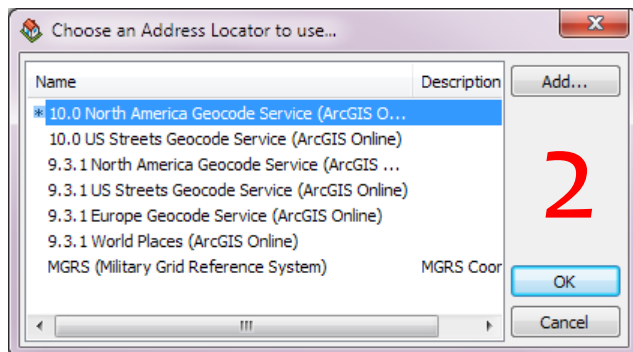
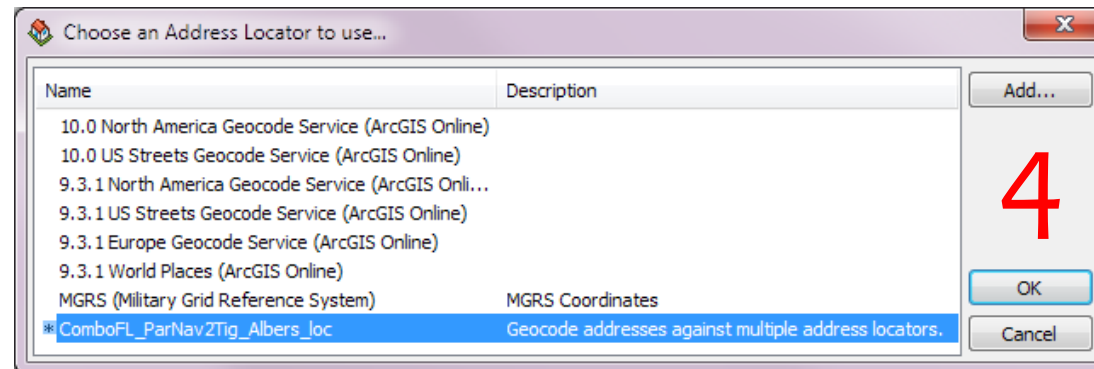
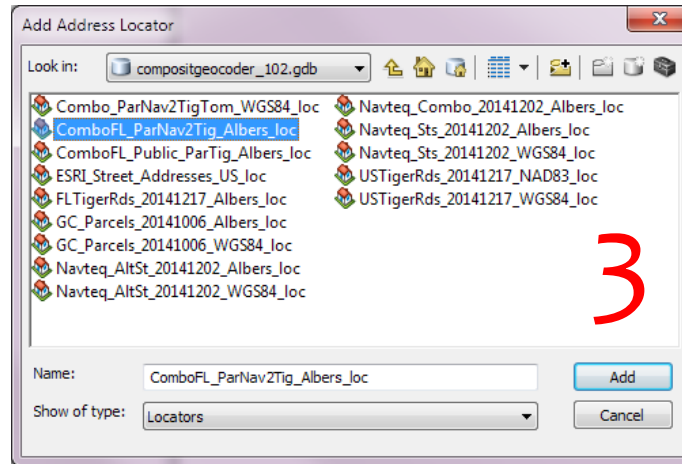
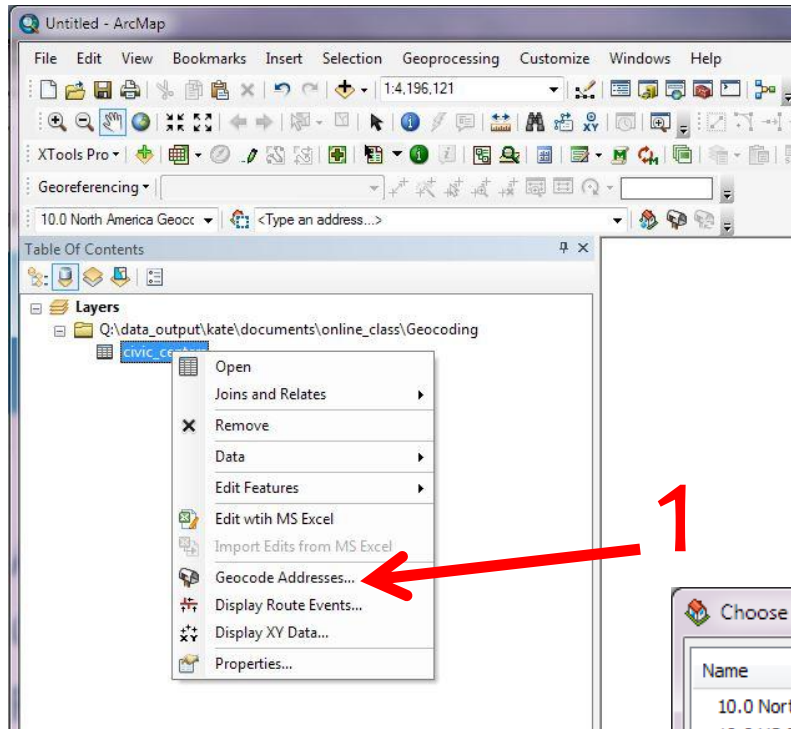


Point feature class **GeocodingResult**

Score	AddressField	MatchAddress
64	2006 Calle de Sebastian	2005 CLL DE
100	2010 Conejo Dr	SEBASTIAN
100	2001 Ft Union Drive	2010 CONEJO DR
81	612 Calle do Leon	2001 FORT UNION DR
100	2115 Calle de Sebastian	612 CLL DE LEON
85	504 Calle de Valdez	2115 CLL DE
100	612 Calle delValdes	SEBASTIAN
100	2017Valley Rio	504 CLL DE VALDES



Example: Basic ArcMap Geocoding, Civic Centers



Example: Basic ArcMap Geocoding, Civic Centers

Table

Geocoding Result: Geocoding_Result

FID	Shape	Loc_name	Status	Score	Match_type	Match_addr	Side	User_fid	Addr_type	ARC_Street
0	Point	Navteq_Sts_201	M	100	A	1375 MONROE ST, FORT MYERS, FL, 33901	R	0	Address	1375 MONROE STREET
1	Point	GC_Parcel_201	M	100	A	11000 EVERBLADES PKWY, ESTERO, FL, 33928			Address	11000 EVERBLADES PARKWAY
2	Point	GC_Parcel_201	M	100	A	10501 FCGU BLVD S, FORT MYERS, FL, 33965			Address	10501 FCGU BLVD SOUTH
3	Point	Navteq_AHSI_2	T	100	A	14100 SW MILE CYPRESS PKWY, FORT MYERS, FL, 33912	L	0	Address	14100 SW MILE CYPRESS PKWY
4	Point	Navteq_Sts_201	M	99.92	A	2201 EDSON AVE, FORT MYERS, FL, 33901	R	0	Address	2201 EDSON AVE
5	Point	GC_Parcel_201	M	99.13	A	11831 BAYSHORE RD, NORTH FORT MYERS, FL, 33917			Address	11831 BAYSHORE ROAD
6	Point	Navteq_Sts_201	M	100	A	1500 WANNISH WAY, TALLAHASSEE, FL, 32307	L	0	Address	1500 WANNISH WAY
7	Point	Navteq_Sts_201	M	85.63	A	W PENSACOLA ST & STADIUM DR E, TALLAHASSEE, FL, 32304			Intersection	PENSACOLA STREET & STADIUM DRIVE
8	Point		U	0	A					CONNECTOR RD & CHEFFAN WAY
9	Point	GC_Parcel_201	M	92.5	A	505 W PENSACOLA ST, TALLAHASSEE, FL, 32301			Address	505 W PENSACOLA ST
10	Point	GC_Parcel_201	M	100	A	400 W CHURCH ST, ORLANDO, FL, 32801			Address	400 W CHURCH ST
11	Point	GC_Parcel_201	M	100	A	1875 SILVER SPUR LN, KISSIMMEE, FL, 34744			Address	1875 SILVER SPUR LANE
12	Point	GC_Parcel_201	T	87.35	A	700 S VICTORY WAY, KISSIMMEE, FL, 34747			Address	700 S VICTORY LANE
13	Point	GC_Parcel_201	M	100	A	401 CHANNELSIDE DR, TAMPA, FL, 33602			Address	401 CHANNELSIDE DR
14	Point		U	0	A					3802 DR MARTIN LUTHER KING JR BLVD
15	Point	GC_Parcel_201	T	85.06	A	4201 N DL MABRY, TAMPA, FL, 33607			Address	4201 NORTH DALE MABRY HIGHWAY
16	Point	GC_Parcel_201	T	92.5	A	4202 E FOWLER AVE, TAMPA, FL, 33612			Address	4202 EAST FOWLER AVE
17	Point	Navteq_Sts_201	M	100	A	4001 26TH ST, VERO BEACH, FL, 32960	L	0	Address	4001 26TH STREET
18	Point		U	0	A					S U N F DR
19	Point	GC_Parcel_201	M	100	A	11380 NW 27TH AVE, MIAMI, FL, 33167			Address	11380 NW 27TH AVE
20	Point	FLTigerRds_201	M	100	A	11852 UNIVERSITY OF NORTH FL DR, JACKSONVILLE, FL, 32224	R	0	Address	11852 UNIVERSITY OF NORTH FL DR
21	Point	Navteq_Sts_201	M	100	A	11011 SW 104TH ST, MIAMI, FL, 33176	L	0	Address	11011 SW 104TH ST

1

Interactive Rematch - Geocoding_Result

Show results: Unmatched Addresses

NAME	ADDRESS	CITY	ZIPCODE	COI
DICK HOWSER STADIUM AT FLORIDA STATE UNIVERSITY	CONNECTOR RD & CHEFFAN WAY	TALLAHASSEE	32306	LEON
GEORGE M. STEINBRENNER FIELD (LEGENDS FIELD)	3802 DR MARTIN LUTHER KING JR BLVD	TAMPA	33607	HILLSBOROUGH
HODGES STADIUM AT THE UNIVERSITY OF NORTH FLORIDA	S U N F DR	JACKSONVILLE	32224	DUVAL
EDMUNDS CENTER AT STETSON UNIVERSITY	143 PENNSYLVANIA AVE	DELAND	32723	VOLUSIA
BEN HILL GRIFFIN STADIUM AT THE UNIVERSITY OF FLORIDA	UNIVERSITY AVENUE & NORTH SOUTH DRIVE	GAINESVILLE	32604	ALACHUA
STEPHEN C O'CONNELL CENTER AT THE UNIVERSITY OF FLORIDA	UNIVERSITY AVENUE & NORTH SOUTH DRIVE	GAINESVILLE	32604	ALACHUA
UFE ARENA AT THE UNIVERSITY OF CENTRAL FLORIDA	50 N GEMINI BLVD	ORLANDO	32816	ORANGE
BRIGHT HOUSE NETWORKS STADIUM AT THE UNIVERSITY OF CEN	N ORION BLVD	ORLANDO	32826	ORANGE
CHARLES AND RUTH CLEMENTE CENTER FOR SPORTS AND RECR	3011 PANTHER PLACE	MELBOURNE	32901	BREVARD
GEORGE W JENKINS FIELD HOUSE	S INGRAHAM AVE	LAKELAND	33801	POLK
THE ARCADIA ALL-FLORIDA CHAMPIONSHIP RODEO	HILLSBOROUGH AVE SE	ARCADIA	34266	DESOTO
MOORE GYMNASIUM AT BETHUNE-COOKMAN COLLEGE	640 DR MMB BLVD	DAYTONA BEACH	32114	VOLUSIA

Matched: 72 (76%)
Tied: 11 (12%)
Unmatched: 12 (13%)

Locator: <All>

Addresses: Street or Intersection: 3802 W DR MARTIN LUTHER KING JR BLVD
City or Placename: TAMPA
State: FL
ZIP Code: 33614

118 Candidates

Loc_name	Score	Side	Match_addr	House	PreDir	Pr
Navteq_Sts_...	100	R	3802 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	79	L	3803 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.43	R	3900 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.42	L	3902 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.42	L	3914 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.35	L	4000 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.34	R	4014 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.28	L	4100 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.21	L	4200 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.2	R	4210 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.17	L	4250 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.13	R	4310 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		
Navteq_Sts_...	68.06	R	4400 W DR MARTIN LUTHER KING JR BLVD, TAMPA, FL, ...	W		

Candidate details:

House: 3802
PreDir: W
PreType: BLVD
StreetName: DR MARTIN LUTHER KING JR
SuType: BLVD
SuDir: W
City: TAMPA
State: FL
ZIP: 33614
User_fid: 0
Addr_type: Address
FromAddr: 3898
ToAddr: 3800
Loc_name: Navteq_Sts_20

Geocoding Options... Zoom to Candidates Pick Address from Map Search Match Unmatch Save Edits Close

2

Untitled - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:3,658,190

XTools Pro

Georeferencing

ComboFL_ParNav2Tig_AI <Type an address...>

Table of Contents

- Layers
 - Q:\data_output\kate\documents\online_class\Geocoding
 - Geocoding Result: Geocoding_Result
 - civic_centers

Layer Properties

General Source Selection Display Symbology Fields Definition Query HTML Popup Labels XCallout

Extent

Top: 716212.242745 m
Left: 90982.119400 m Right: 791388.305442 m
Bottom: 190742.751714 m

Data Source

Data Type: Shapefile Feature Class
Shapefile: Q:\data_output\kate\documents\online_class\Geocoding
Geometry Type: Point
Coordinates have Z values: No
Coordinates have measures: No

Projected Coordinate System: Albers Conical Equal Area [Florida Geographic Data Lib.
Projection: Albers
False_Easting: 400000.00000000
False_Northing: 0.00000000

Set Data Source...

Geostatistical Analyst Tools
Kate_Tools
MGRS Tools

3

Resources & Sources

- * TIGER API Access, batch geocode (web interface):
 - * <https://geocoding.geo.census.gov/geocoder/locations/addressbatch?form>
- * Texas A&M Geocoding Services
 - * <http://geoservices.tamu.edu/Services/Geocode/>
- * ArcGIS Python API: batch_geocode() method
 - * <https://developers.arcgis.com/python/guide/Batch-Geocoding/>
- * Improving batch geocoding performance
 - * <https://blogs.esri.com/esri/arcgis/2011/02/09/tuning-a-locator-for-improved-performance/>
- * Zeiler, M., & Murphy, J. (2010). Modeling Our World, 2nd Edition: The ESRI Guide to Geodatabase Concepts (pp. 164-181). Redlands, CA: ESRI Press.
- * Cardinal and Ordinal Numbers Chart
 - * <http://www.mathsisfun.com/numbers/cardinal-ordinal-chart.html>

Questions?