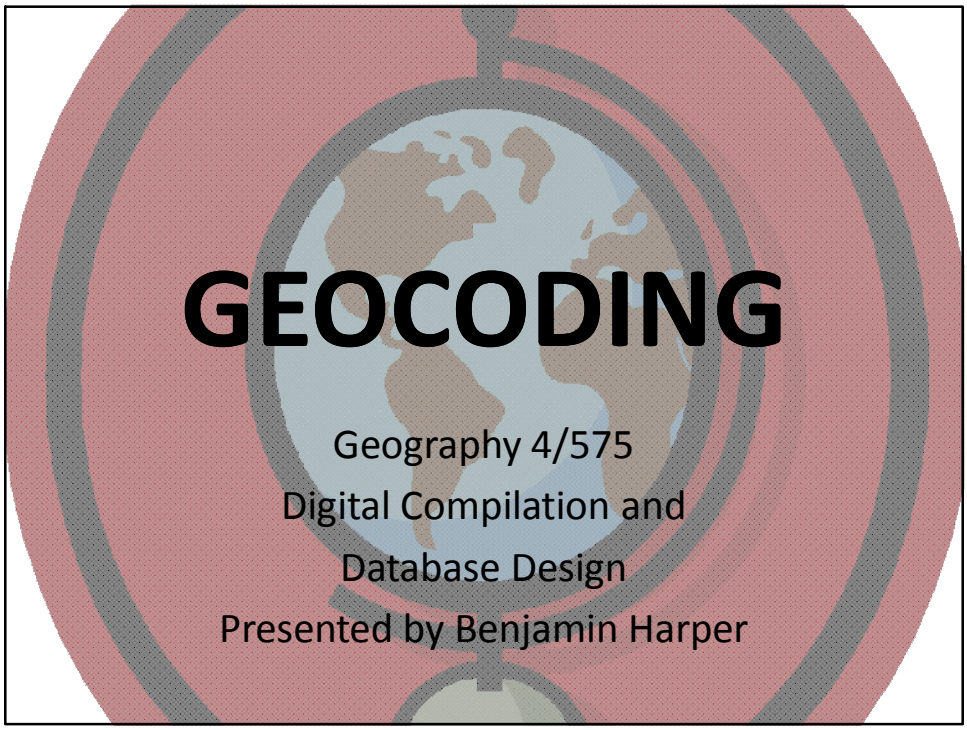


Geocoding: Refers to the process of assigning spatial locations to data that are in tabular format but have fields that describe their locations.

•Also known as **address geocoding** or **address matching**

•**Requirements**:

✓A data set with individual street addresses in a table (one record per address)

✓ A reference database that consists of a street map and attributes for each street segment

Name	Address	Zip
Iron Horse,	407 E Sherman Ave,	83814
Franlin's Hoagies,	501 N 4th St,	83814
McDonald's,	208 W Appleway,	83814
Rockin Robin Cafe,	3650 N Government way,	83815
Olive Garden,	525 W Canfield Ave,	83815
Fernan Range Station,	2502 E Sherman Ave,	83814
FBI,	250 Northwest Blvd,	83814
ID Fish & Game,	2750 W Kathleen Ave,	83814
ID Health & Welfare,	1120 W Ironwood Dr,	83814
ID Transportation Dept,	600 W Prairie Ave,	83815

Can be a coverage, shapefile, or geodatabase feature class in ArcGIS
You can create your own address locator in ArcCatalog or use a pre-existing one.

Examples: TIGER/Line files (Government)
RLIS Streets files (Metro)
Tele Atlas (Commercial)

Example of Reference Database -Attributes of Tiger/Line Files

FEDIRP: A Direction that precedes a street name
FENAME: The name of a street.
FETYPE: The street name type such as St, Rd, and Ln.
FRADDL: The beginning address number on the left side of a street segment
TOADDL: The ending address number on the left side of a street segment.
FRADDR: The beginning address number on the right side of a street segment.
TOADDR: The ending address number on the right side of a street segment.
ZIPL: The zip code for the left side of a street segment.
ZIPR: The zip code for the right side of a street segment.

Why is this important…Address geocoding interpolates the location of a street address by comparing it with data in the reference database

Address Matching Process

Three Phases

1. Preprocessing
2. Matching
3. Plotting

Preprocessing

- Parsing and Address Standardization

Parsing breaks down the address into a number of components
Address Standardization identifies and places each address component in order

Example from Chang Text: "630 S. Main Street, Moscow Idaho 83843-3040"
- Street Number (630)
- Prefix Direction (S or South)
- Street Name (Main)
- Street Type (Street)
- City (Moscow)
- State (Idaho)
- Zip+4 code (83843-3040)

We now have values for each address component to be matched to the reference database

Matching Problems

Mismatches can occur from a variety of errors

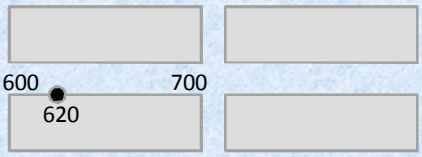
- **Misspelling** of street name
- **Incorrect**… address number, prefix direction, street type, abbreviations etc.
- The **reference database** can have **outdated information** and will not match new addresses
- The reference database may also have other problems such as missing address ranges and other incorrect information.

Successful Matching= Plotting

Output: Each address is a plotted point feature

How: Linear Interpolation is used to approximate where an address number falls within an address range of a particular street segment.

Example: Address Number is **620**



Options for Address Matching

- The user is given the liberty to decide the rigor or accuracy of address matching

  In ArcGIS we have the option to dictate a **minimum candidate score** and **minimum match score**. (out of 100)

Minimum candidate score- can determine the candidates from reference database

Minimum match score- determines whether an address is matched or not

Spelling Sensitivity- adjust how strict spelling matches…careful

Lower match score will give better match results but may result in more errors

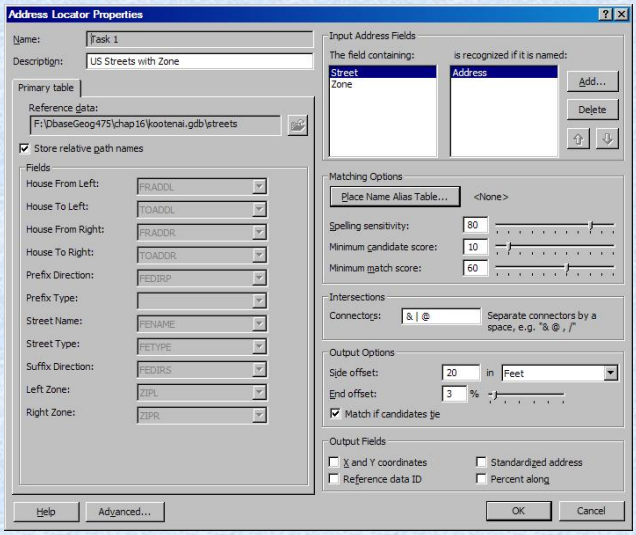
Side and End Offsets

- End Offset: places a point feature off of the end of a street segment at a user defined distance

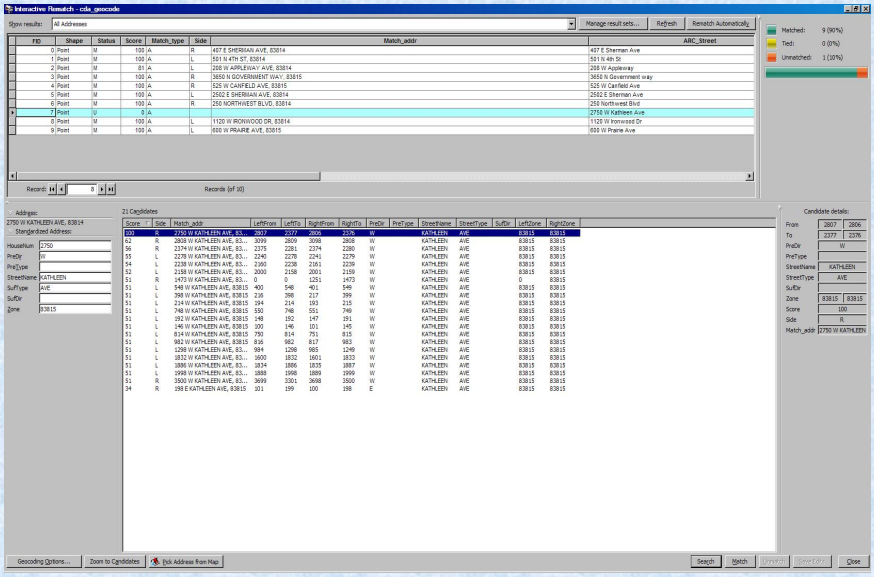
  Useful for preventing points from falling on top of cross streets
- Side Offset: places a point feature at a specified distance to the side of the street segment

  Useful for point in polygon analysis, i.e. points associated with taxlot parcels

Dialog for Address Locator



Rematch Dialog



How to Improve Geocoding Accuracy

- Standardize addresses to USPS format for use with TIGER/Line
- Use internet mapping engines, Google Maps as a second source and street view can help ground-truth
- Familiarize yourself with the common mistakes of your local reference database (Metro RLIS streets)… trial and error.

North Portland and Rosa Parks (same)

Historic Columbia River Hwy (no “Historic”)

Variations of Geocoding

- **Intersection Matching**- often used in mapping of motor vehicle accidents
- **Zip Code Geocoding**- matches the zip code to its centroid location (appears to be a last resort option or large scale mapping)
- **Reverse Geocoding**- converts point locations to addresses

Geocoding Apps

- **Location based services**- Mapquest, Google Maps and all the others.
- **Business Apps**- Zip codes tied to census data
- **Wireless Emergency Services**- Your mobile phone is tracked by a FCC mandate for 911 purposes
- **Crime Mapping**- mapping hot spots of deviant and delinquent behavior
- **Public Health**- epidemiological analysis

References

- Chang, Kang-tsung. *Introduction to Geographic Information Systems*. 5th. New York: McGraw Hill, 2010. 346-352. Print.
- ArcGIS Desktop Help, Geocoding and Address Management

Thank You!