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Geoscripting Project Description

**Objective**

The objective of this project is to create a package that connects property parcel polygons to a street lines in preparation for network analysis.

**Description/Methodology (Probably too ambitious, on the next page are simpler functions that accomplish the same objective)**

When doing network analysis it is necessary to connect points (which serve as origins and destinations) to lines (which serve as conduits such as streets and sidewalks). Following are the logical steps needed to accomplish this if you start out with parcel polygons and street lines.

1. Generate centroid points (CentroidPoints) from the ParcelPolygons. Preserve the original ParcelPolygons attribute data in the new CentroidPoints.
2. Generate a new point dataset (LinePoints) with points on top of the line dataset (OrigLines) which are closest to each original point. The number of LinePoints will equal the number of CentroidPoints.
3. Create new lines (ConnectLines) that connect each LinePoint to their corresponding CentroidPoints. This will be done according to either common attributes or to proximity.
4. Create a new line dataset (LineNetwork). Add OrigLines and ConnectLines.
5. Split all lines in LineNetwork by their intersection (necessary for network analysis).

**Result**

The result will be a parcel centroid shapefile and a network ready line shapefile that includes the new connections to the ParcelCentroids.

**Demo Dataset**

The demo dataset will be a few blocks of street centerlines and parcels in the DU area of Denver. This data is available from the Denver Open Data Catalog.

**Functions Storyboard**

1. **PolyCentroid(polygon dataset)**

Generate centroid points from polygons. Centroid points will retain the attributes of the polygons.

Input: Spatialpolygonsdataframe

Output: New spatialpointsdataframe

1. **SnapPointsToLine(points dataset, lines dataset)**

Generate a new point dataset where the locations of each new point are based on the distance of the original point to the nearest line. Attributes of the original points are retained in the new points

Input: Spatialpointsdataframe, spatiallinesdataframe

Output: New spatialpointsdataframe

1. **SplitLinesByPoint (lines dataset, points dataset)**

Split lines where points intersect the dataset. A new dataset of the split lines is generated and the attributes of the original lines are retained in the split dataset.

Input: Spatiallinesdataframe, spatialpointsdataframe

Output: New Spatiallinesdataframe