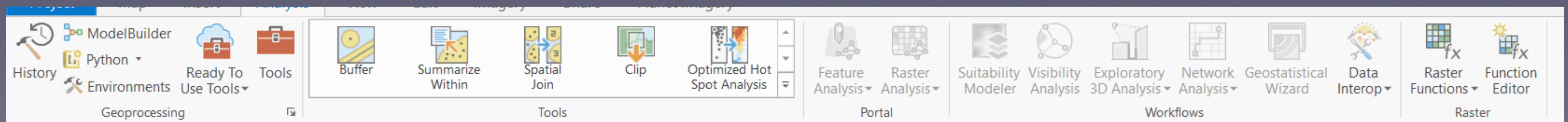
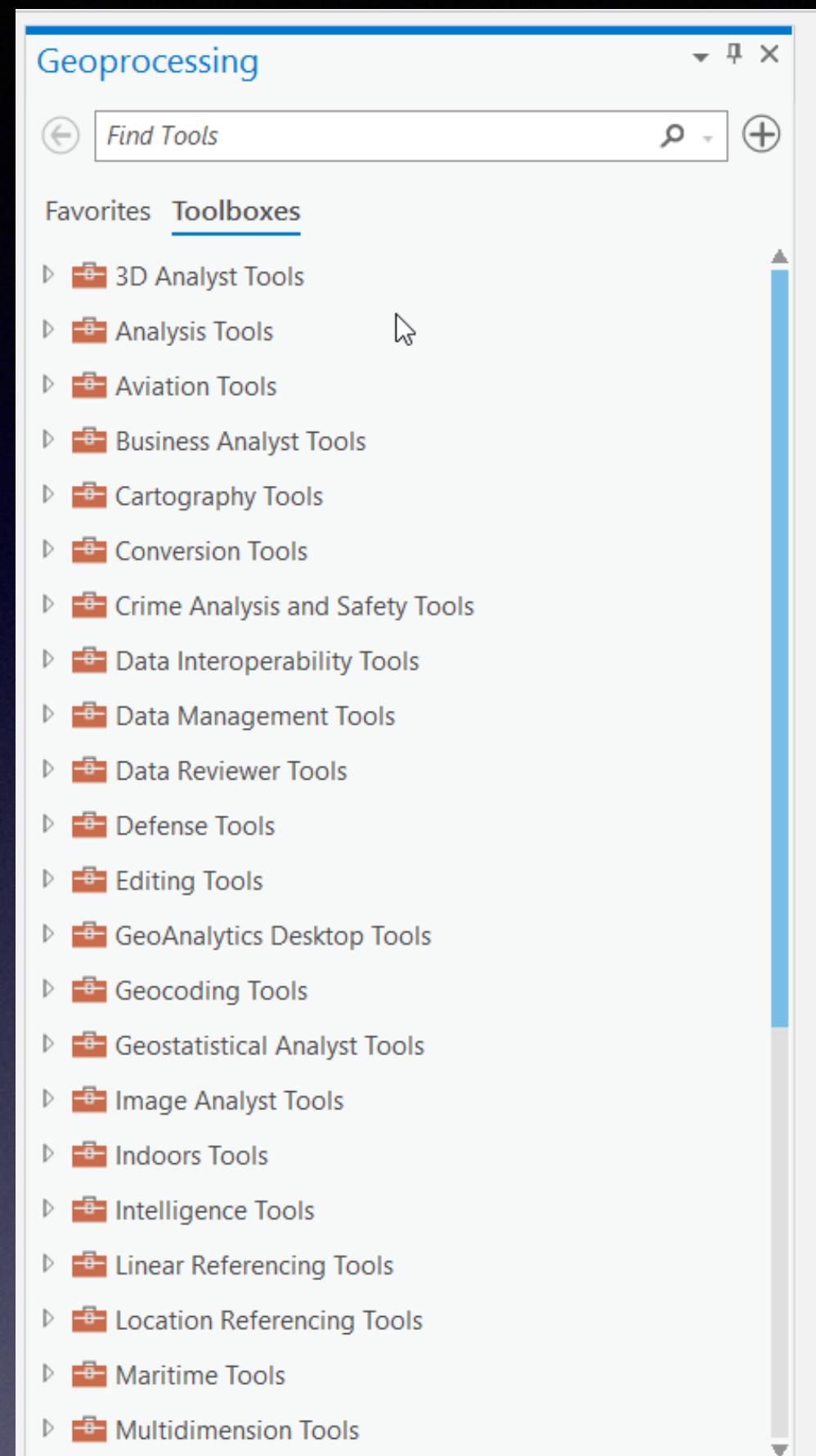


Geoprocessing

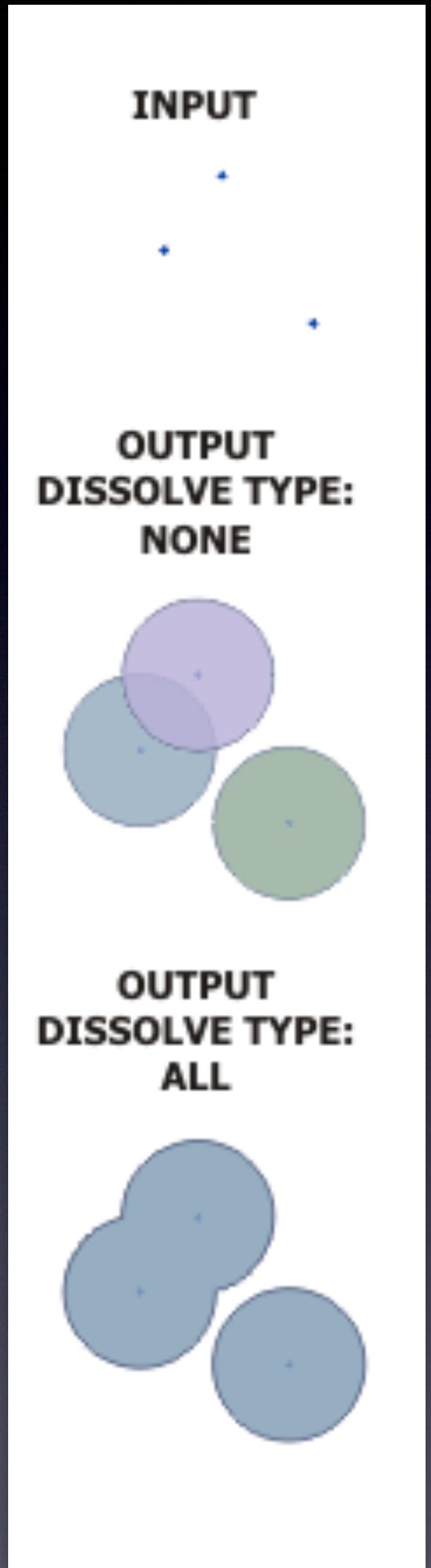
Basic Geoprocessing

- We are only going to look at some of the basic tools found in your Analysis Ribbon
- Each tool has a help document and we will be using the pptx file which has all of the data pre loaded

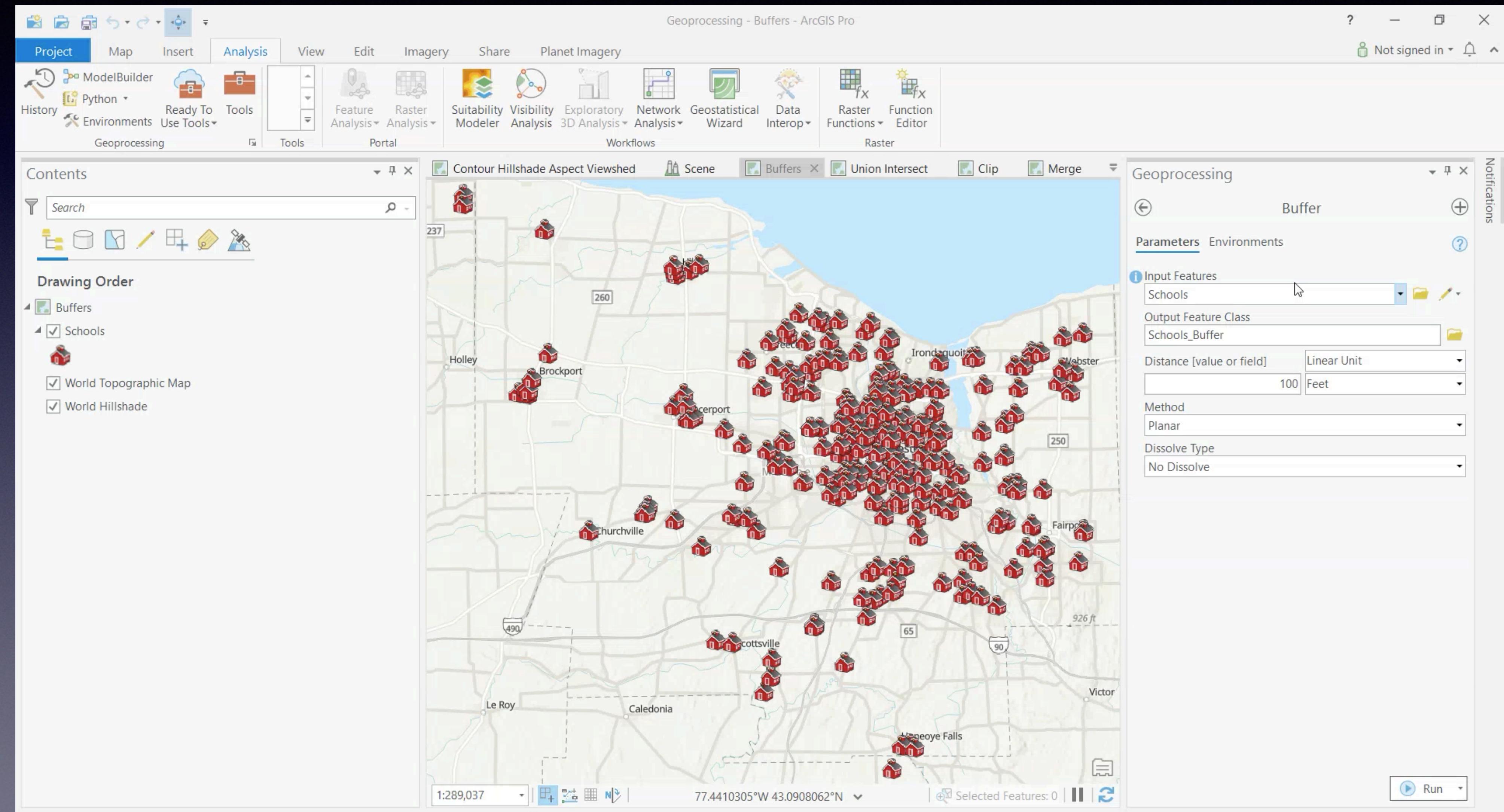


Buffer

- We are first going to do a simple point buffer
- For this we are going to use the day care centers and we are going to do a 100 foot buffer around them
- This gives a visual representation of the buffer and can be used for further analysis

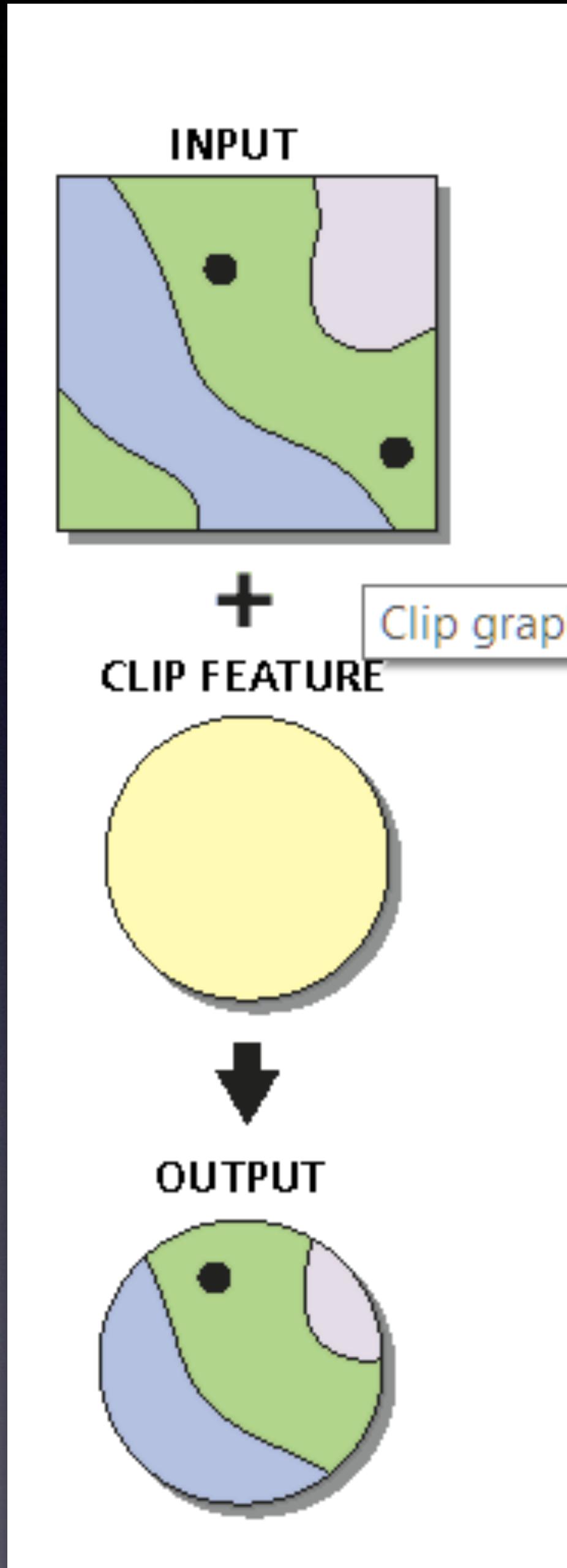


Buffer

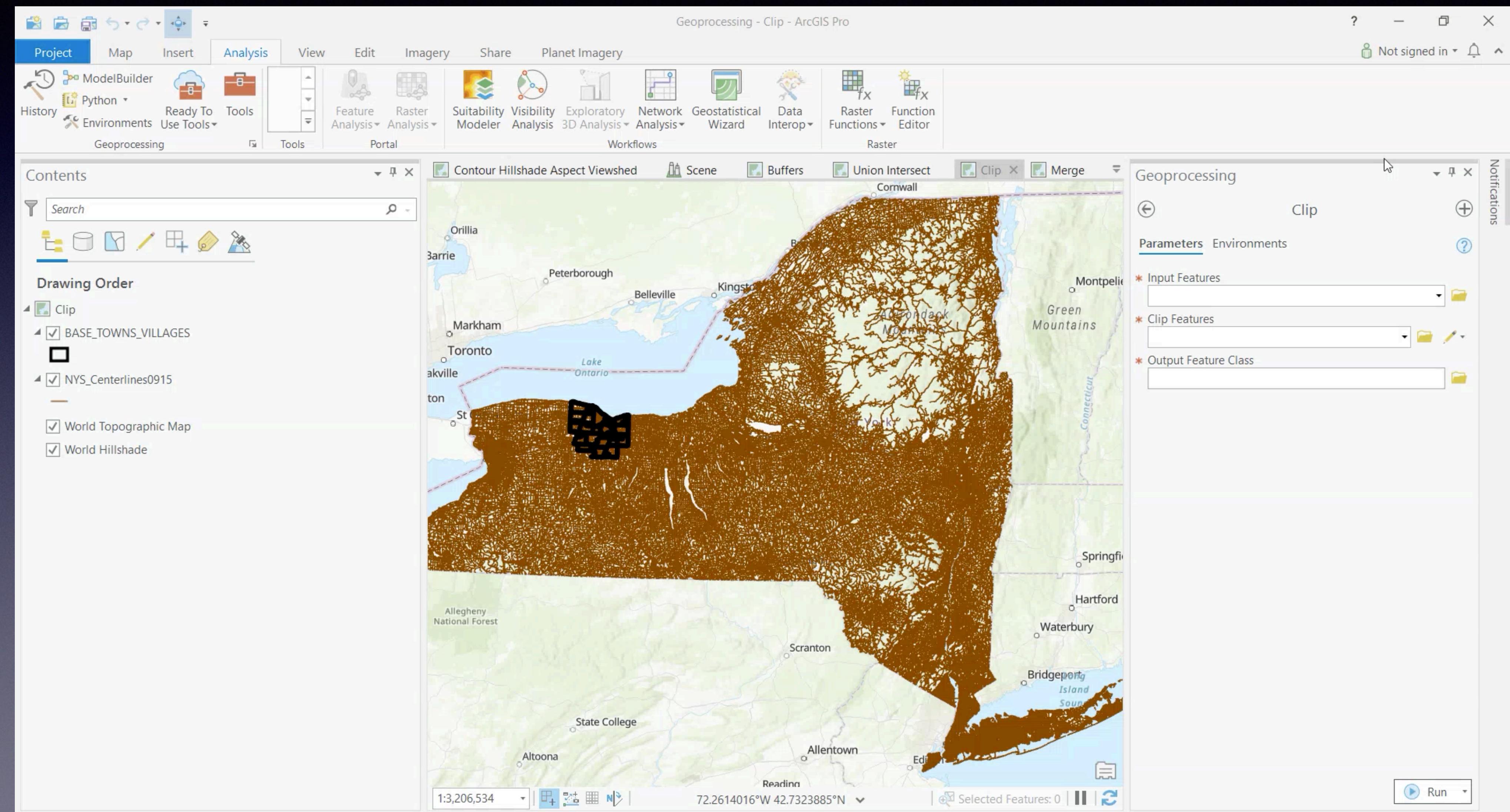


Clip

- Clip extracts only a part of a dataset against a clip feature (cookie cutter)
- You will get what ever falls within the area
- We will explore the tool using the NYS Centerlines and Monroe County Town and Villages



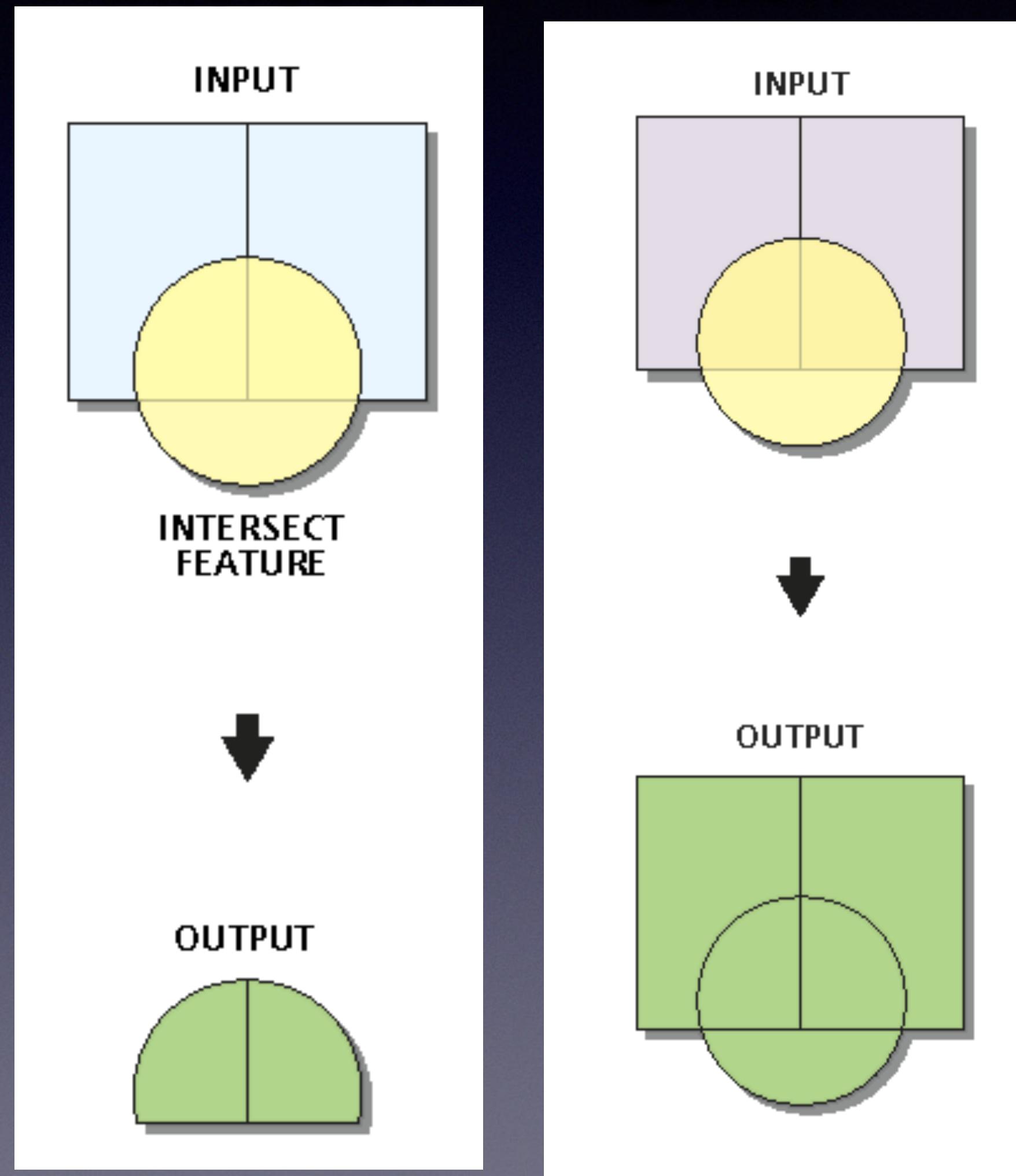
Clip



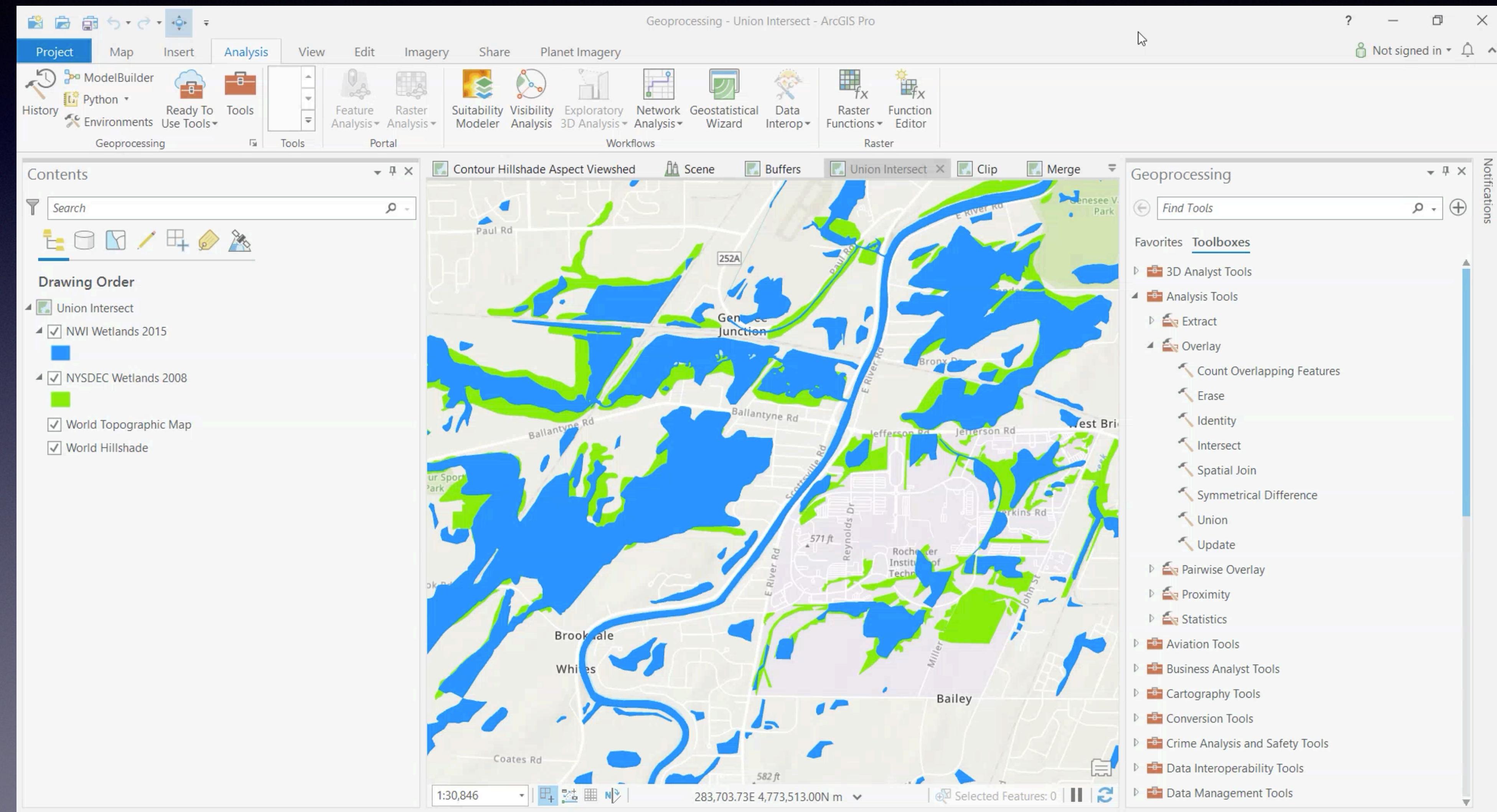
Intersect and Union

Intersect

- Intersect and Union take two similar features and combine them together.
- Intersect only keeps the like parts
- Union keeps all parts but cuts them where they are different
- We will explore these using the wetland layers

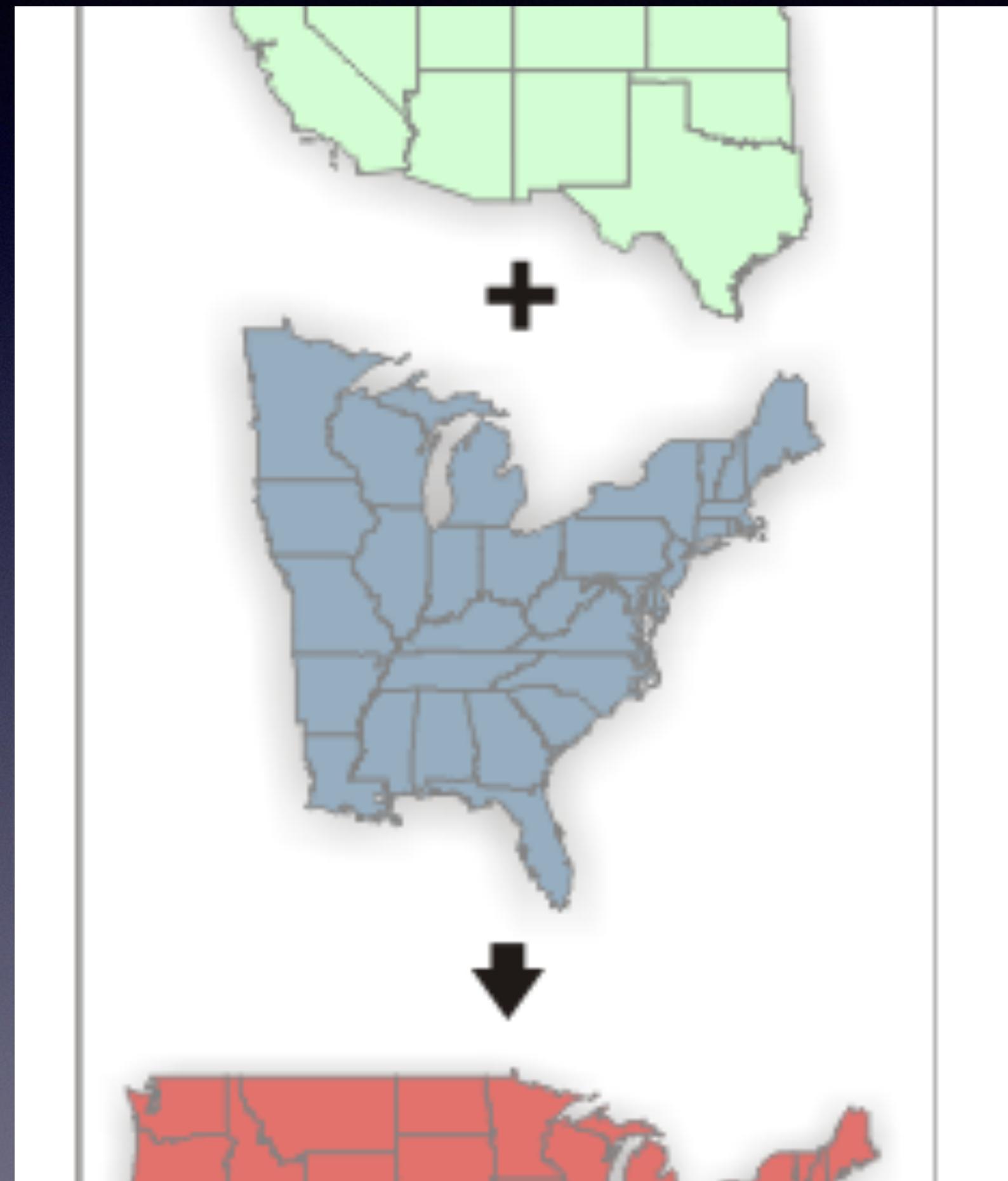


Intersect and Union



Merge

- Merge takes two or more layers and combines them
- It differs from Union and Intersect, because it just combines them without analyzing the geometry for likes
- It works well for combining tiled datasets with the same attribute schema
- We will just play with the wetlands and this layer to see how it reacts



Merge

Geoprocessing - Merge - ArcGIS Pro

Project Map Insert Analysis View Edit Imagery Share Planet Imagery

History ModelBuilder Python Environments Ready To Use Tools Tools Feature Analysis Raster Analysis Suitability Modeler Visibility Analysis Exploratory 3D Analysis Network Analysis Geostatistical Wizard Data Interop Raster Functions Function Editor

Geoprocessing Tools Portal Workflows Raster

Contents

Search

Drawing Order

- Merge
 - Wetland037
 - Wetland121
 - Wetland117
 - Wetland073
 - Wetland069
 - Wetland055
 - Wetland051
- World Topographic Map
- World Hillshade

Contour Hillshade Aspect Viewshed Scene Buffers Union Intersect Clip Merge

Map showing a geographic area with various land cover types and roads labeled with route numbers (e.g., 104, 259, 390, 63, 332, 20, 364, 15, 39, 36, 54). The map includes labels for Rochester, Batavia, and Letchworth State Park.

Geoprocessing

merge

Merge (Data Management Tools)
Combines multiple input datasets into a single, new output dataset. This tool can combine point, line, or polygon fe...

Merge Divided Roads (Cartography Tools)
Generates single-line road features in place of matched pairs of divided road lanes.

Merge Mosaic Dataset Items (Data Management Tools)
Groups multiple items in a mosaic dataset together as one item.

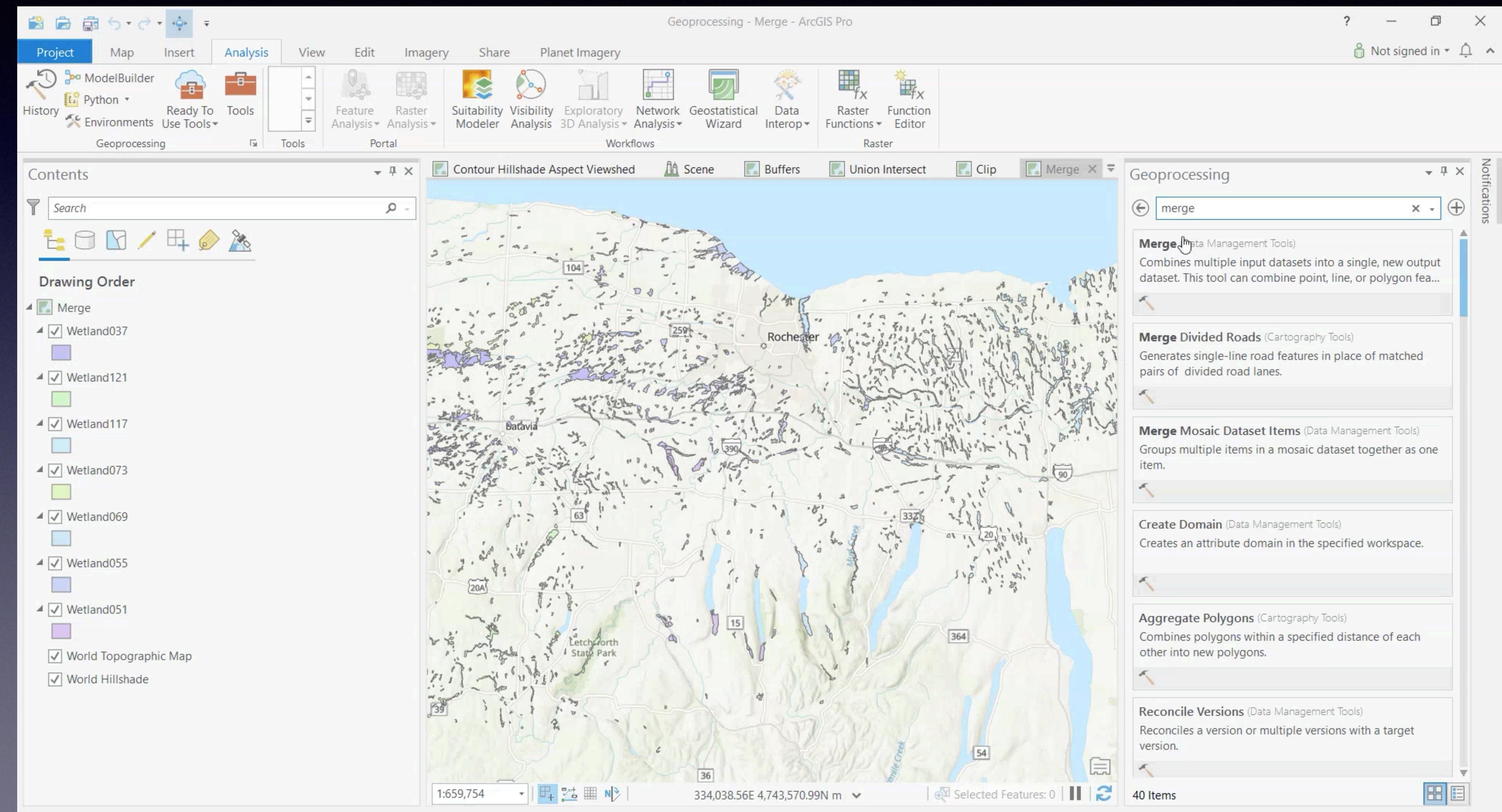
Create Domain (Data Management Tools)
Creates an attribute domain in the specified workspace.

Aggregate Polygons (Cartography Tools)
Combines polygons within a specified distance of each other into new polygons.

Reconcile Versions (Data Management Tools)
Reconciles a version or multiple versions with a target version.

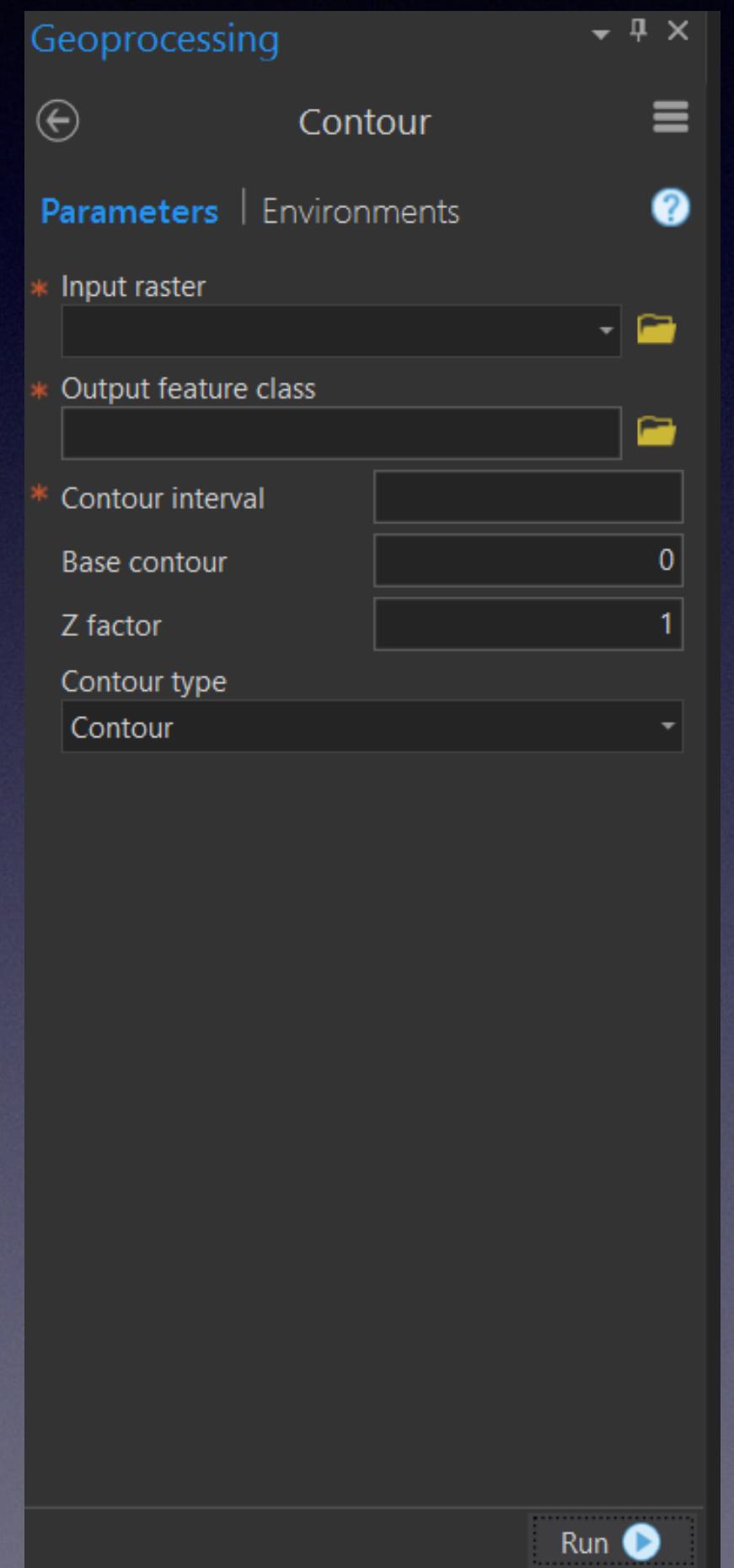
Notifications

40 Items

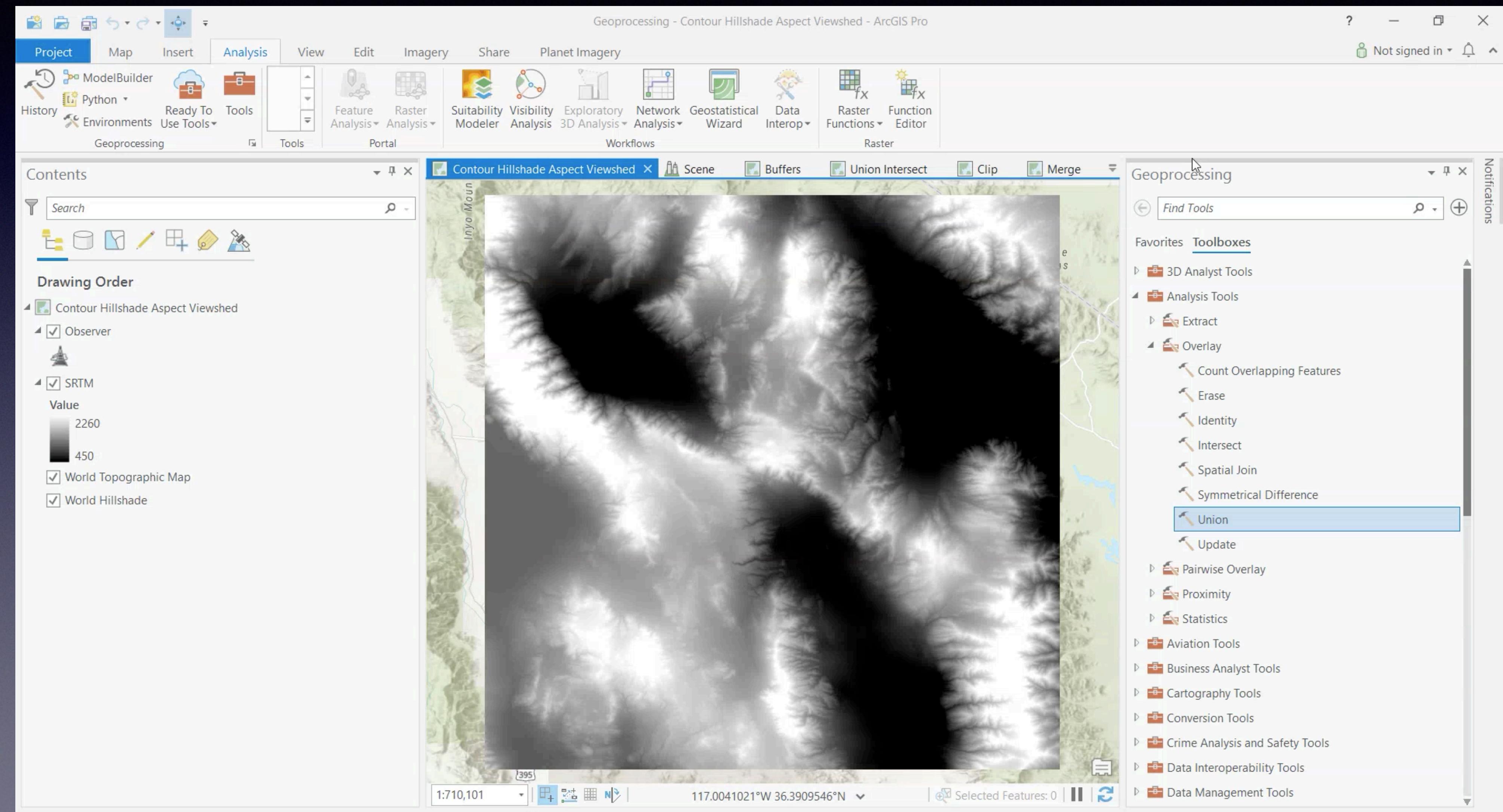


Contours

- Contours are a good way to represent raster data in a vector form
- Contours are based on your manual interval and will draw lines between each pixel

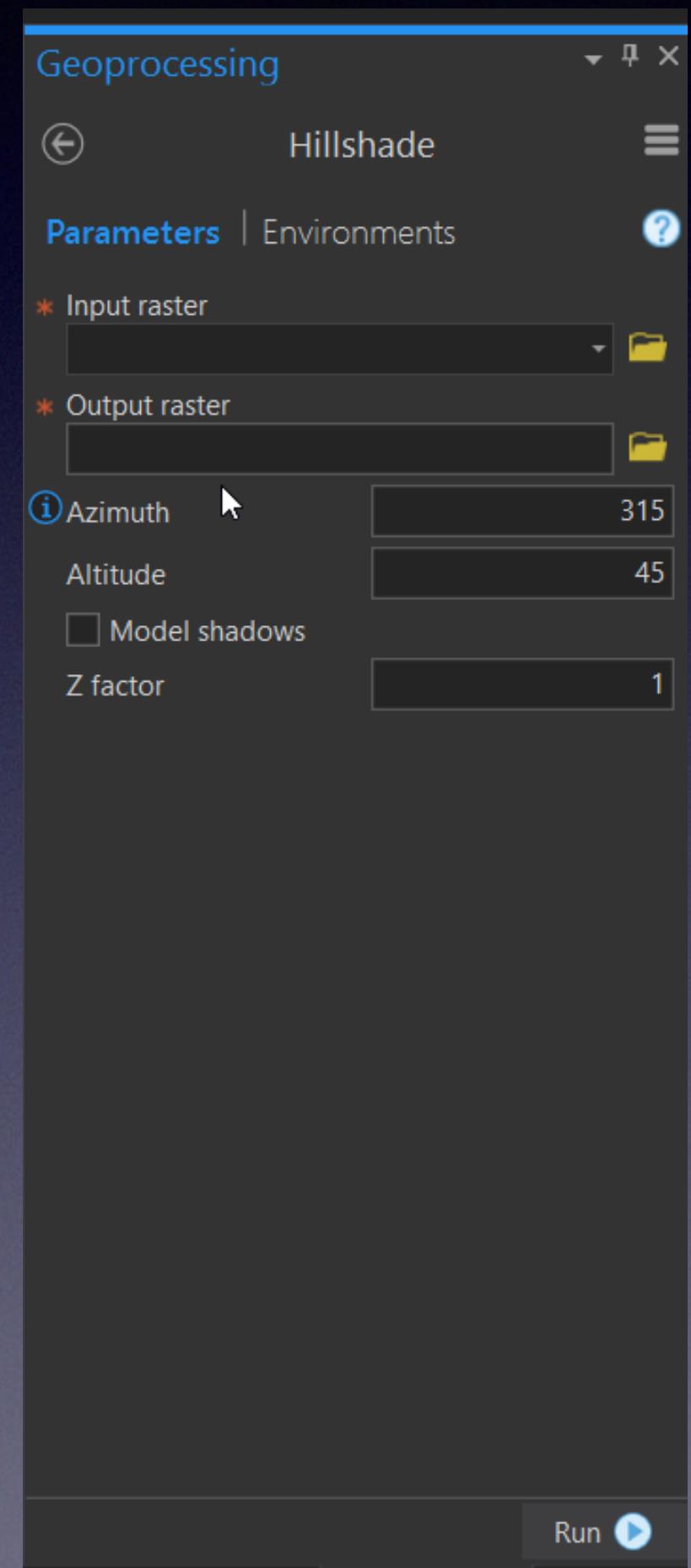


Contour



Hillshade

- Hillshades are great way for a 3D feel in your map
- It takes an elevation dataset and then estimates the shadows on the surface
- You can adjust the sun to change the effect



Hillshade

Geoprocessing - Contour Hillshade Aspect Viewshed - ArcGIS Pro

Raster Layer

Project Map Insert Analysis View Edit Imagery Share Planet Imagery Appearance Data

Cut Copy Paste Copy Path Add Preset Add Graphics Layer Basemap Add Data Select By Attributes Select By Location Measure Locate Infographics Coordinate Conversion Pause Lock View Unplaced More Convert Download Map More Sync Remove

Clipboard Explore Bookmarks Go To XY Add Layer Selection Layer Inquiry Labeling Offline

Contents Search Drawing Order

- Contour Hillshade Aspect Viewshed
 - Observer
- Contour_SRTM_10
- SRTM
 - Value 2260
 - 450

World Topographic Map World Hillshade

Contour Hillshade Aspect Viewshed

Scene Buffers Union Intersect Clip Merge

Geoprocessing

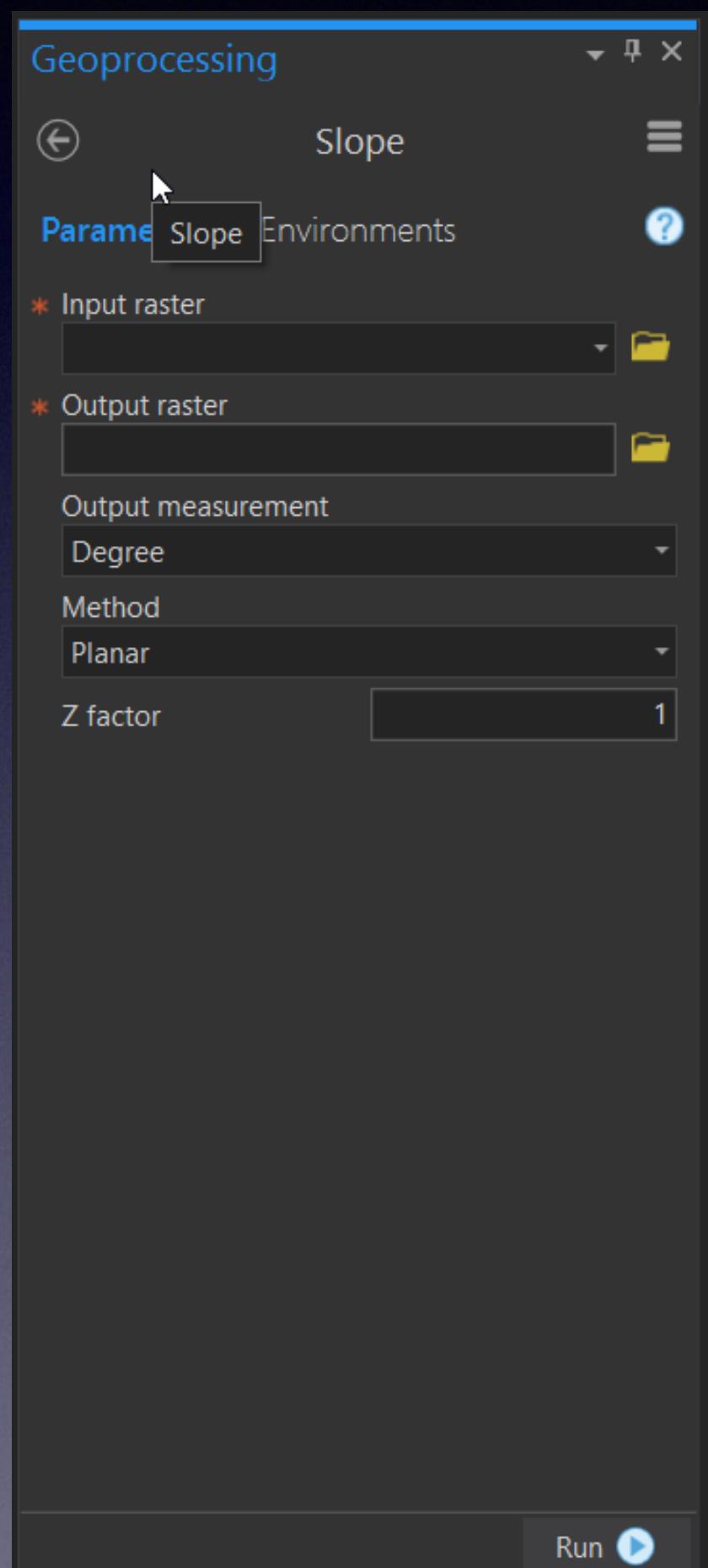
- Contour (3D Analyst Tools)
Creates a feature class of contours from a raster surface
- Contour (Spatial Analyst Tools)
Creates a feature class of contours from a raster surface.
- Contour List (3D Analyst Tools)
Creates a feature class of selected contour values from a raster surface.
- Contour List (Spatial Analyst Tools)
Creates a feature class of selected contour values from a raster surface.
- Contour Annotation (Cartography Tools)
Creates annotation for contour features.
- Contour with Barriers (3D Analyst Tools)
Creates contours from a raster surface. The inclusion of barrier features allows you to independently generat...

Notifications

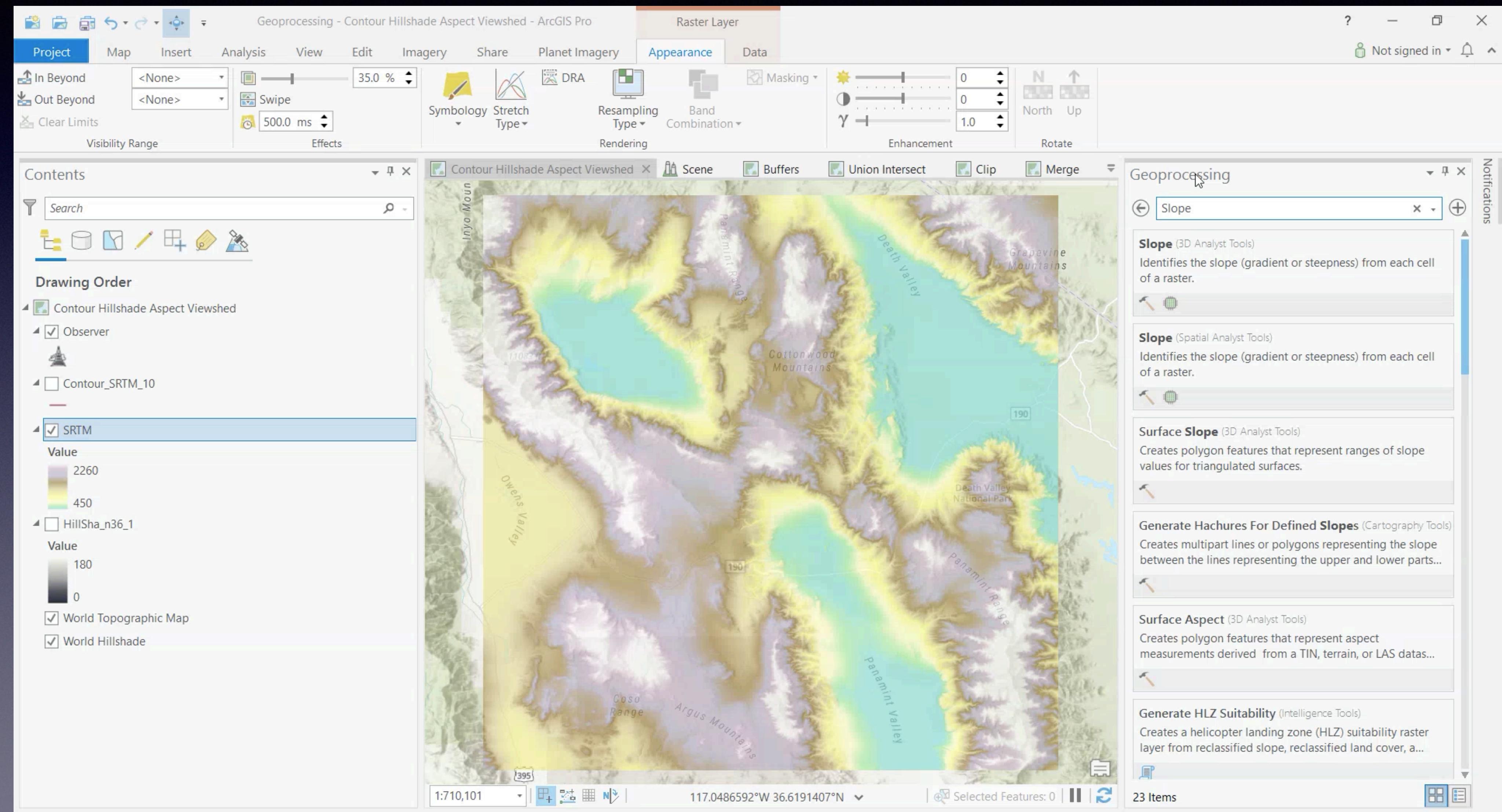
Selected Features: 0 | 24 Items

Slope

- Slopes are great for looking at the change in elevation over a set distance

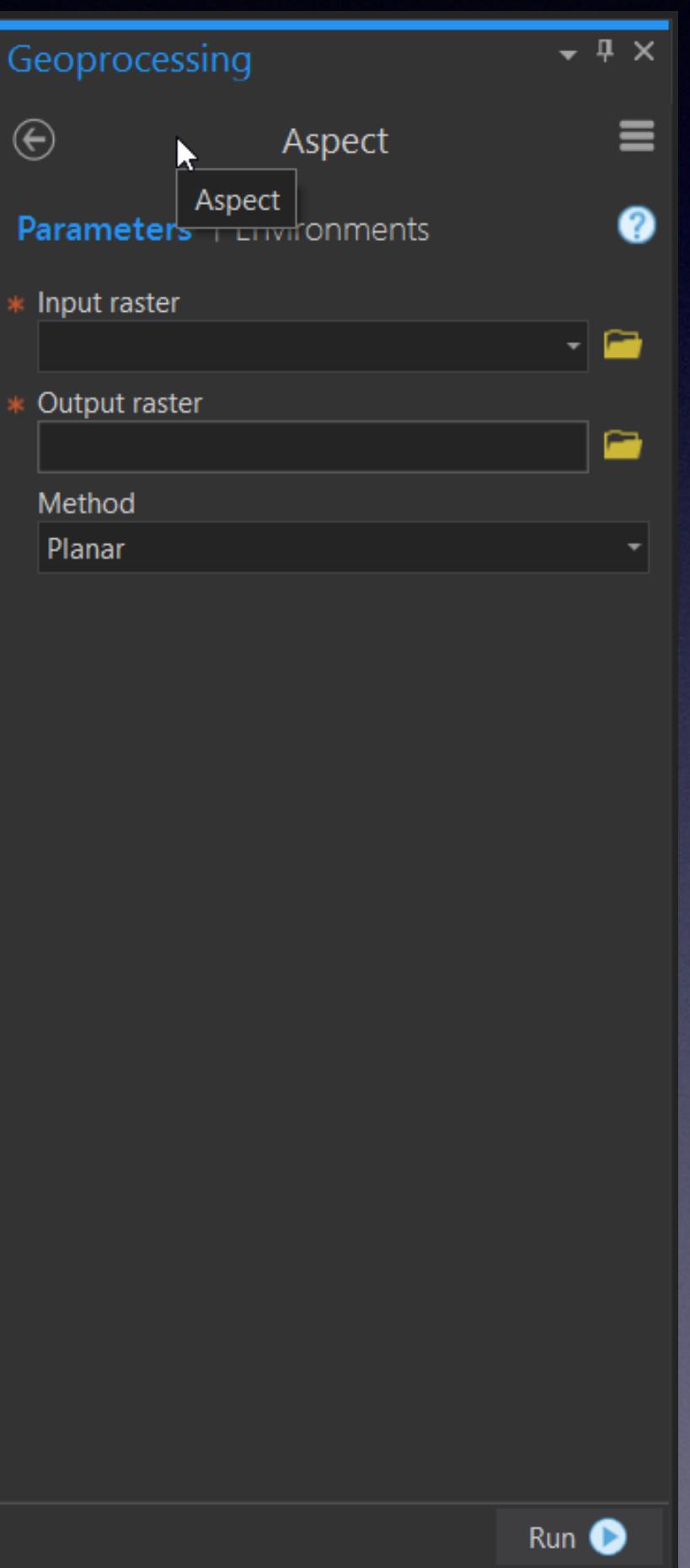


Slope

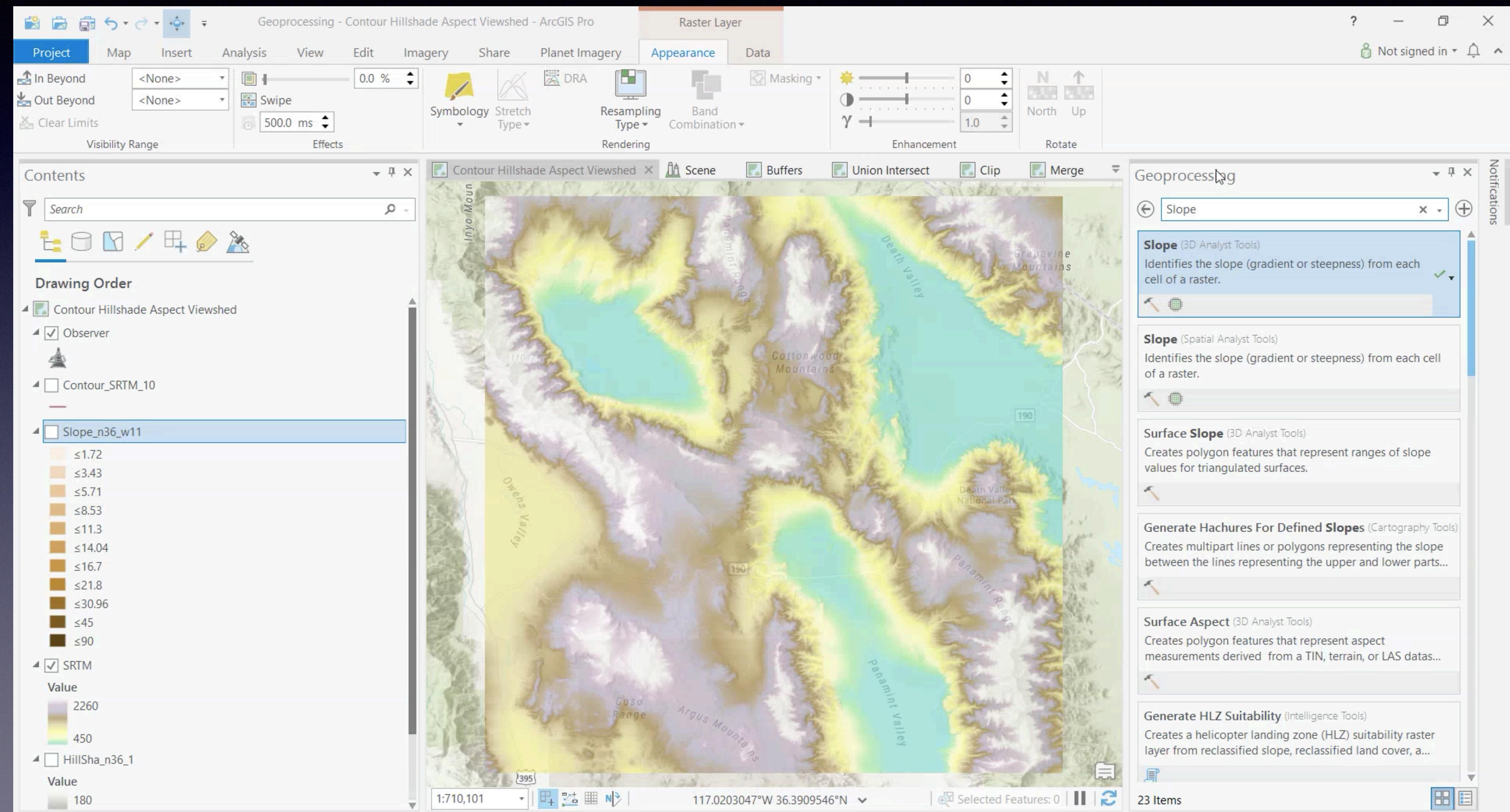


Aspect

- The Aspect of an elevation is which direction the edge is facing
- This is a great tool for looking for solar energy potential of a site

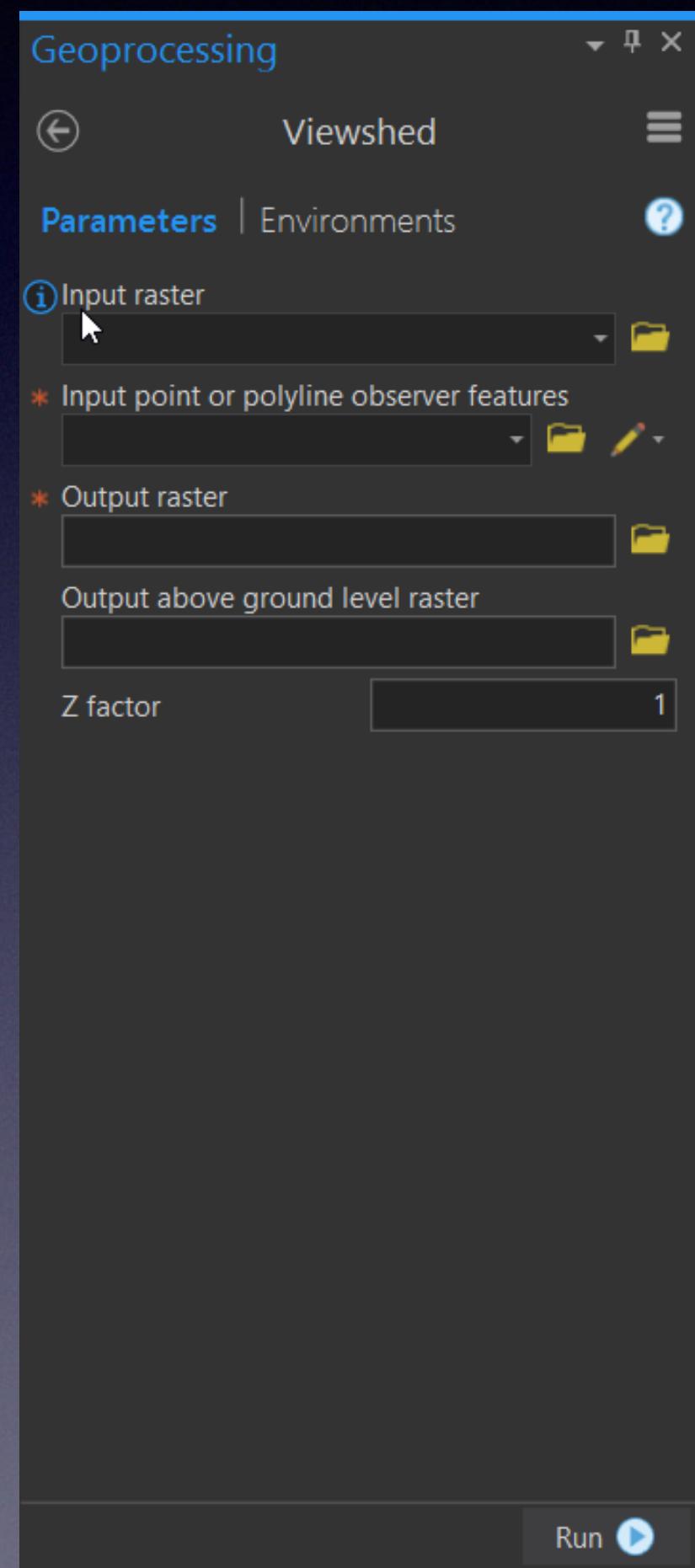


Aspect

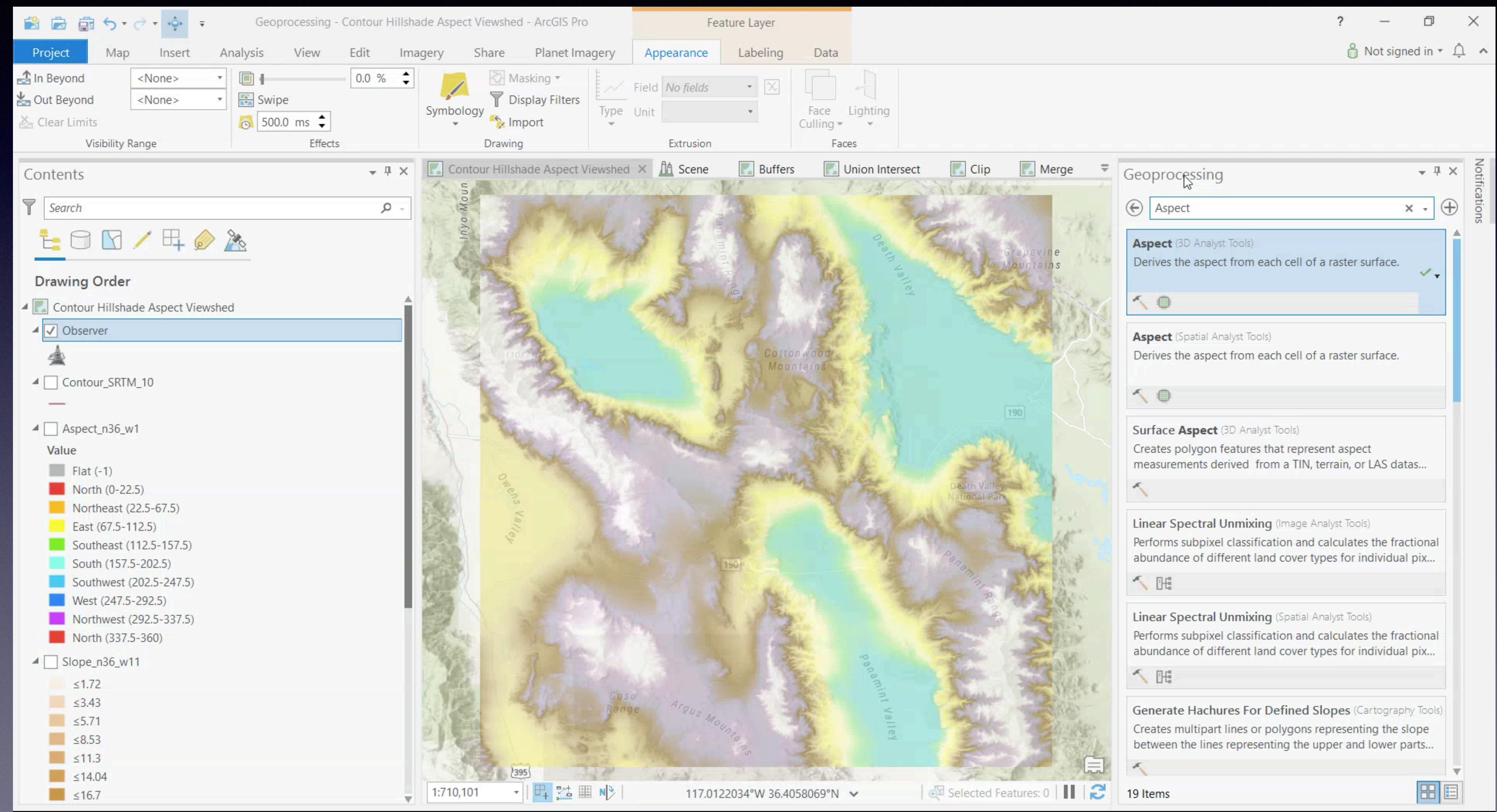


Viewshed

- Viewshed is basically where you can see a point on a landscape.
- It takes an observer feature
- Then it creates a yes no raster for visibility



Viewshed



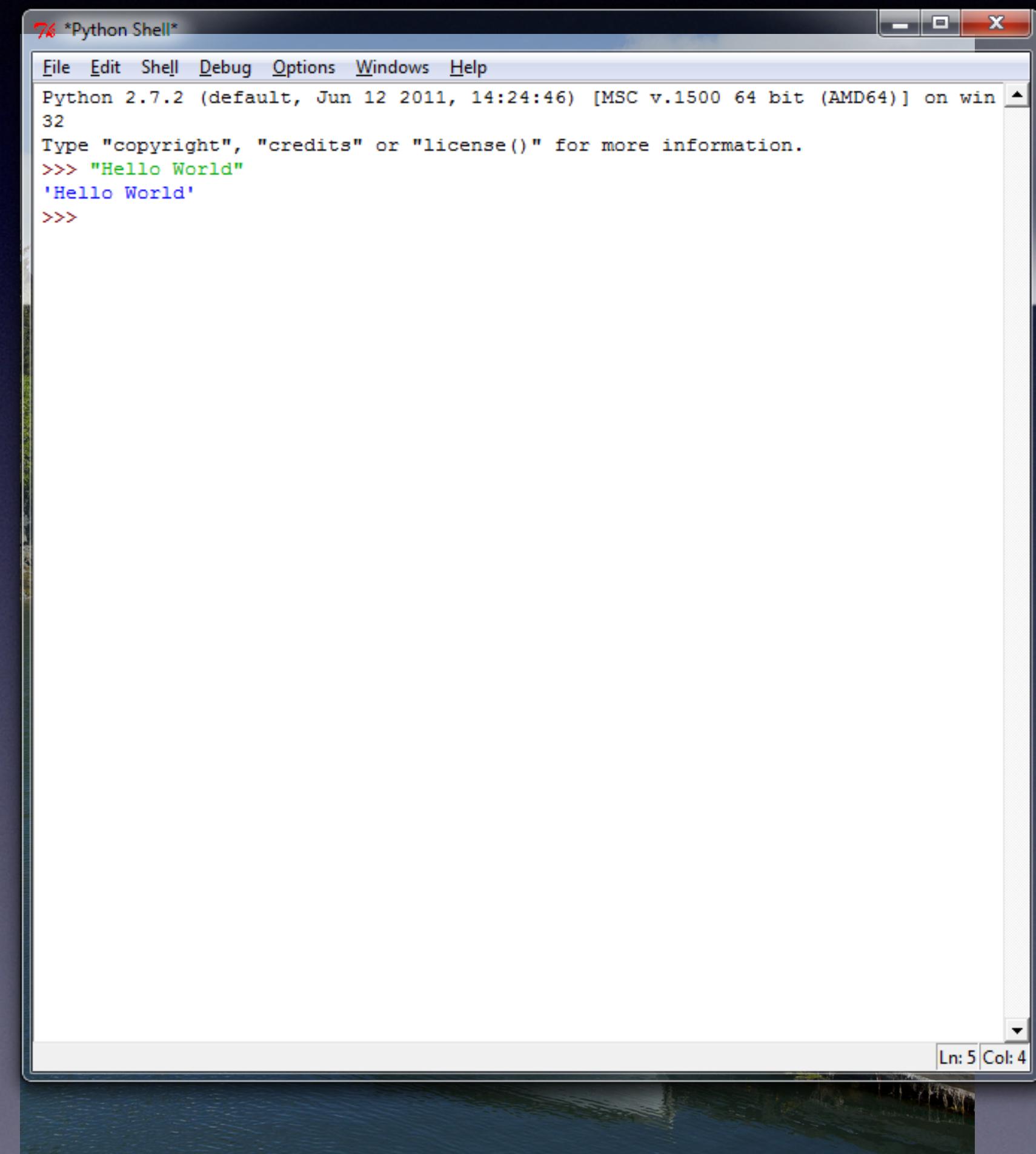
Python

What is Python

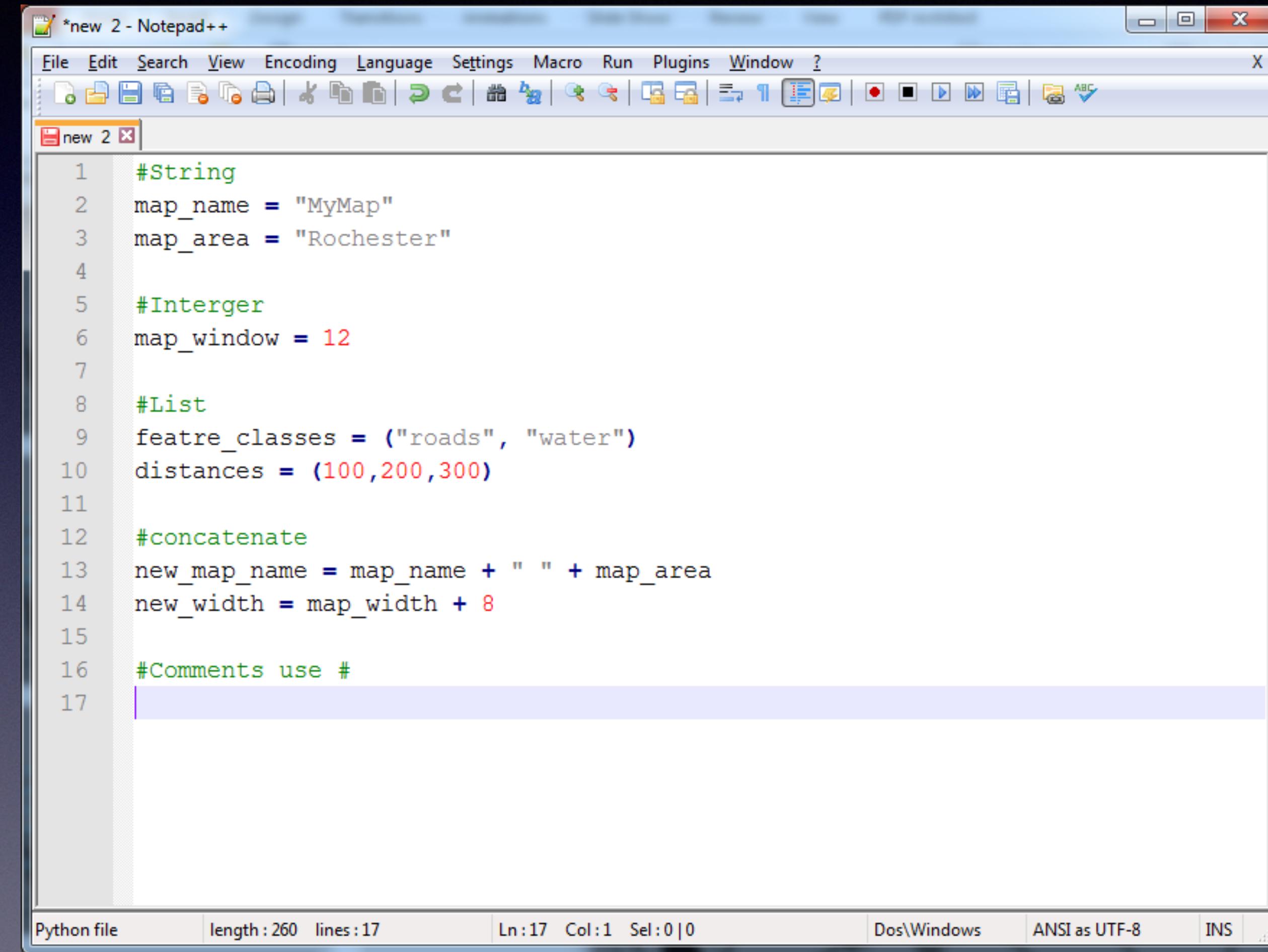
- Open Source Programming Language
- Named After Monty Python
- Comes Installed in ArcGIS
- Allows you to automate geoprocesses, calculate string, and create new layers
- In ArcGIS is it referred to as ArcPy

Python IDLE

- Window within the ArcGIS Start Menu Folder
- Allows you to do basic python commands
- Single Line Entries
- I like Notepad ++ to do my python editing



Basics of Python - Variables

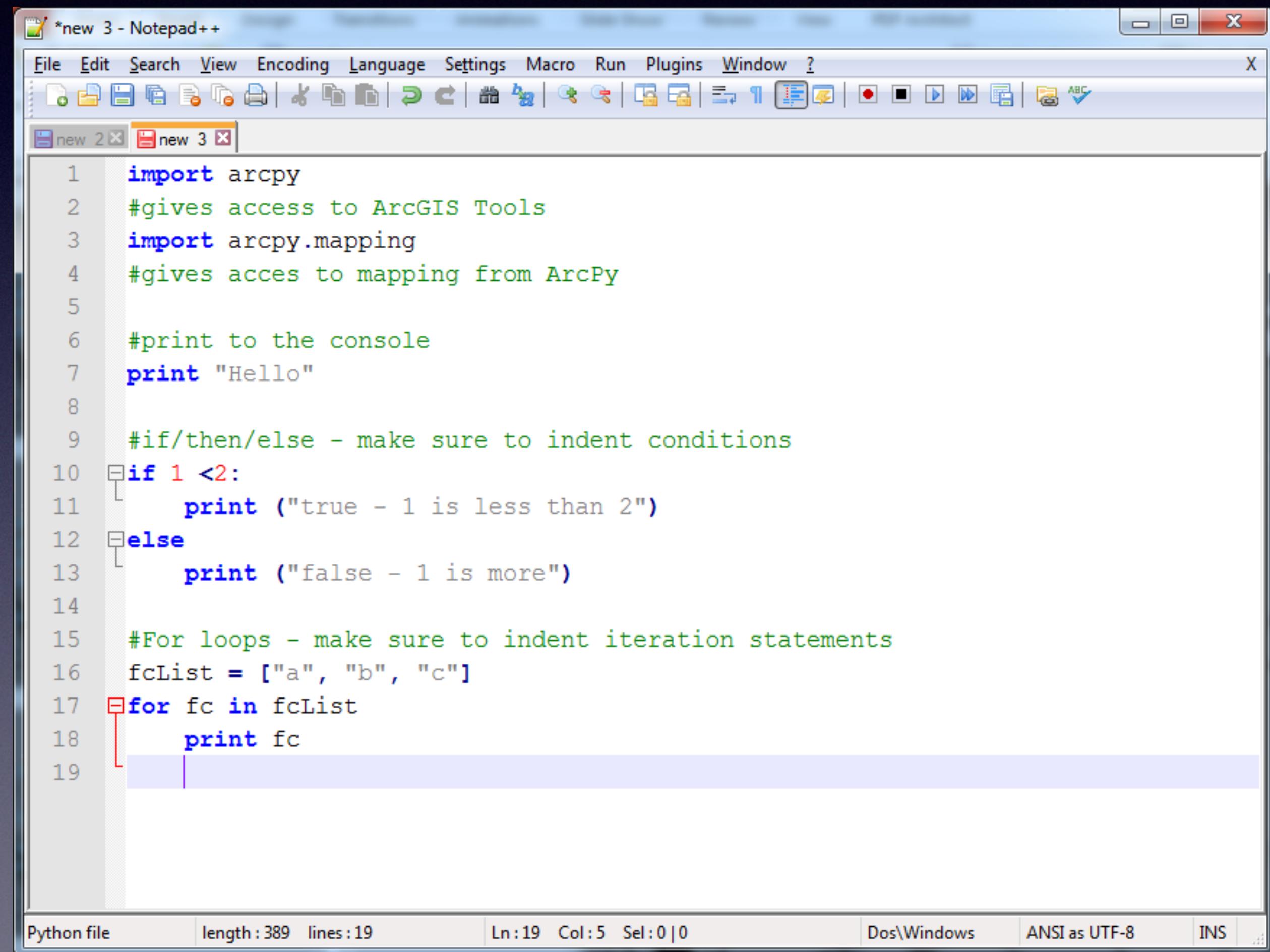


The screenshot shows a Notepad++ window titled "new 2 - Notepad++". The window contains the following Python code:

```
1 #String
2 map_name = "MyMap"
3 map_area = "Rochester"
4
5 #Integer
6 map_window = 12
7
8 #List
9 feature_classes = ("roads", "water")
10 distances = (100,200,300)
11
12 #concatenate
13 new_map_name = map_name + " " + map_area
14 new_width = map_width + 8
15
16 #Comments use #
17
```

The code illustrates various variable types and operations in Python, including strings, integers, lists, concatenation, and comments.

Basics of Python - Statements

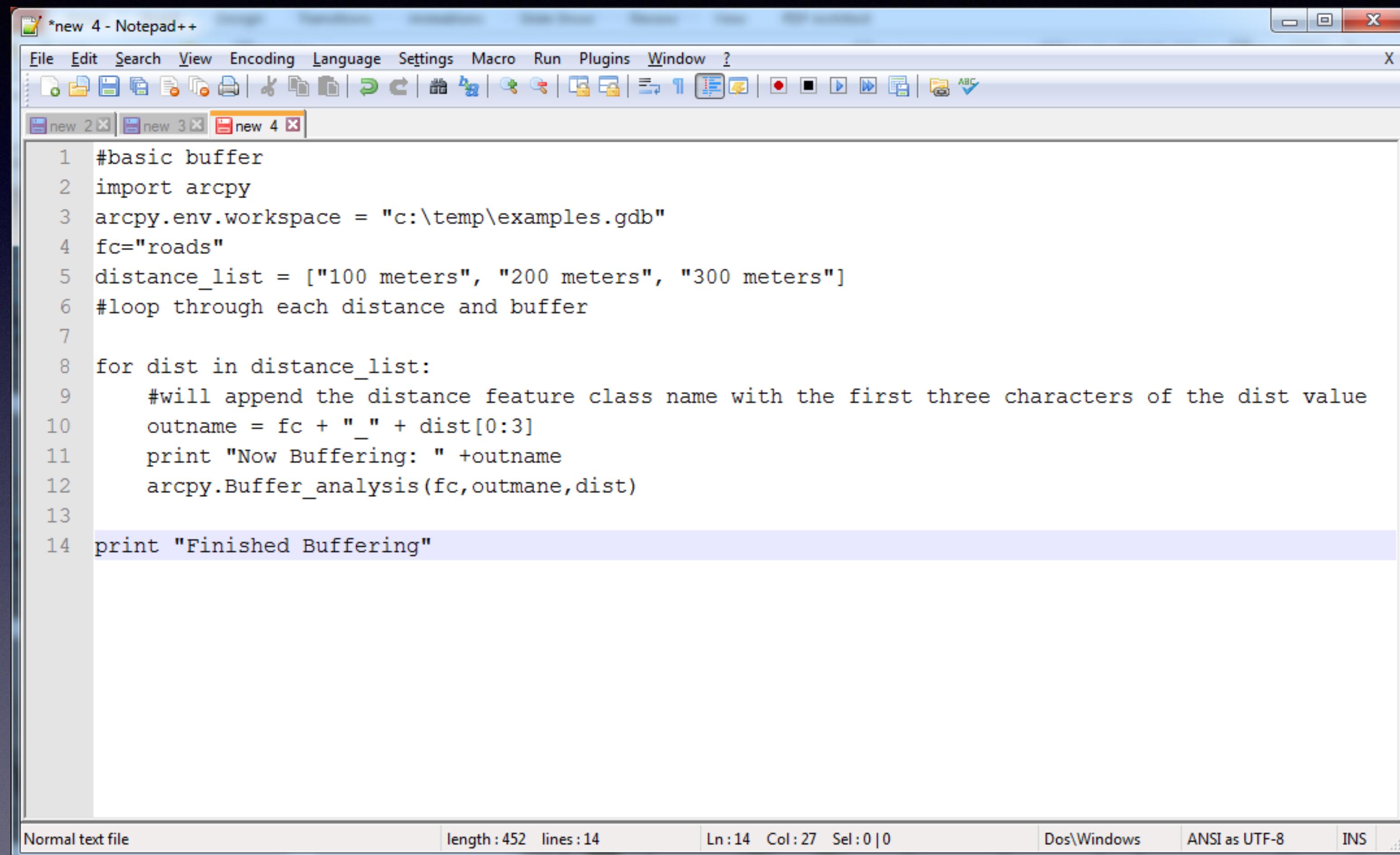


The screenshot shows a Notepad++ window titled "new 3 - Notepad++". The code editor contains the following Python script:

```
1 import arcpy
2 #gives access to ArcGIS Tools
3 import arcpy.mapping
4 #gives acces to mapping from ArcPy
5
6 #print to the console
7 print "Hello"
8
9 #if/then/else - make sure to indent conditions
10 if 1 <2:
11     print ("true - 1 is less than 2")
12 else:
13     print ("false - 1 is more")
14
15 #For loops - make sure to indent iteration statements
16 fcList = ["a", "b", "c"]
17 for fc in fcList:
18     print fc
19
```

The code is color-coded: blue for keywords like `import`, `if`, `else`, and `for`; green for comments; and black for strings and lists. A red square selection highlights the first line of the for loop, specifically the `for` keyword.

Basic Scripting



The screenshot shows a Notepad++ window titled "new 4 - Notepad++". The window contains a Python script for buffering a feature class. The script imports arcpy, sets the workspace to "c:\temp\examples.gdb", defines a feature class "roads", and creates a list of distances ["100 meters", "200 meters", "300 meters"]. It then loops through each distance, appending the first three characters of the distance value to the feature class name to create output names like "roads_100", "roads_200", and "roads_300". It prints each output name and performs a Buffer_analysis operation. Finally, it prints "Finished Buffering". The Notepad++ status bar at the bottom shows "Normal text file", "length : 452 lines : 14", "Ln:14 Col:27 Sel:0|0", "Dos\Windows", "ANSI as UTF-8", and "INS".

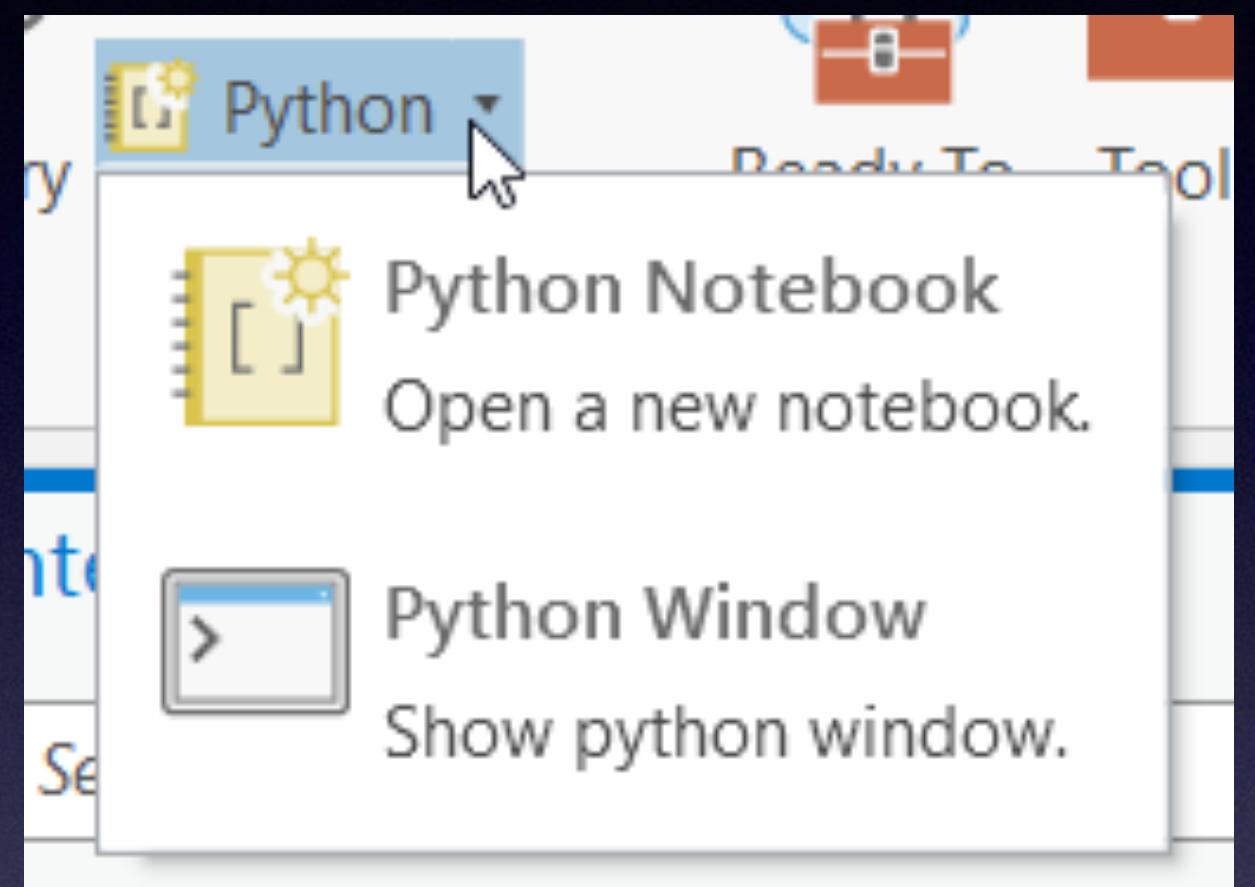
```
1 #basic buffer
2 import arcpy
3 arcpy.env.workspace = "c:\temp\examples.gdb"
4 fc="roads"
5 distance_list = ["100 meters", "200 meters", "300 meters"]
6 #loop through each distance and buffer
7
8 for dist in distance_list:
9     #will append the distance feature class name with the first three characters of the dist value
10    outname = fc + "_" + dist[0:3]
11    print "Now Buffering: " +outname
12    arcpy.Buffer_analysis(fc,outname,dist)
13
14 print "Finished Buffering"
```

All Tools within Toolbox have
Python Equivalents

<http://pro.arcgis.com/en/pro-app/tool-reference/analysis/buffer.htm>

ArcPy Window

- Simple method to get to python from ArcGIS
- Start your command with arcpy
- As you then work with a tool it will help you fill out the other parts of the tool
- Once you finish it you can hit enter

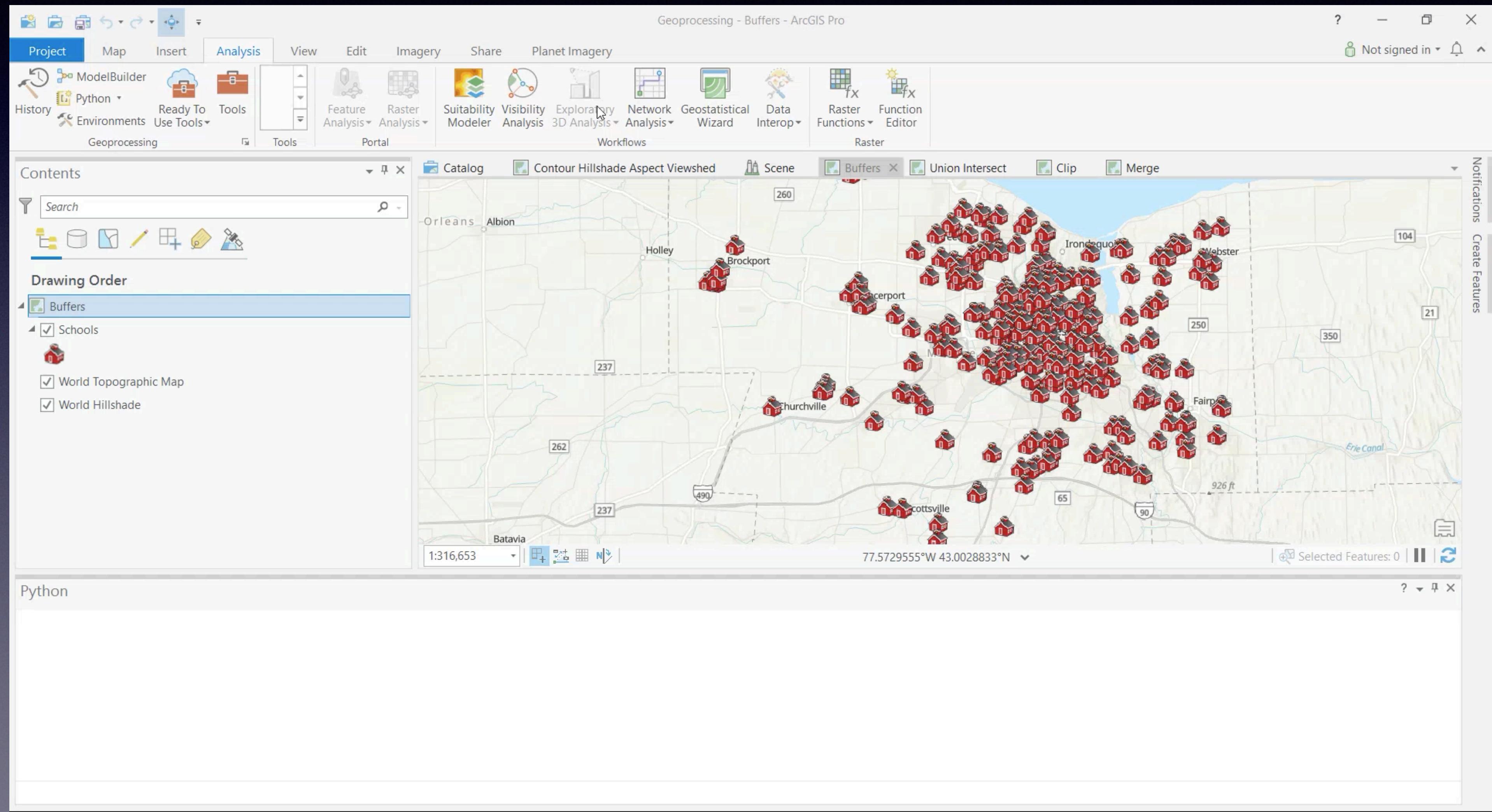
A screenshot of the ArcGIS Python window showing a command being entered. The window title is "Python". In the bottom right corner, a code editor shows the following line of Python code:

```
arcpy.analysis.Buffer('Schools', 'schools200ft', 200)
```

Hands On ArcPy

- We will now use the Geoprocessing PPK from week 10 and explore both Python and Model Builder
- First we will do the buffer using ArcPy
 - `arcpy.Buffer_analysis('Schools', 'School1000ft', 1000)`

Python in ArcGIS Pro



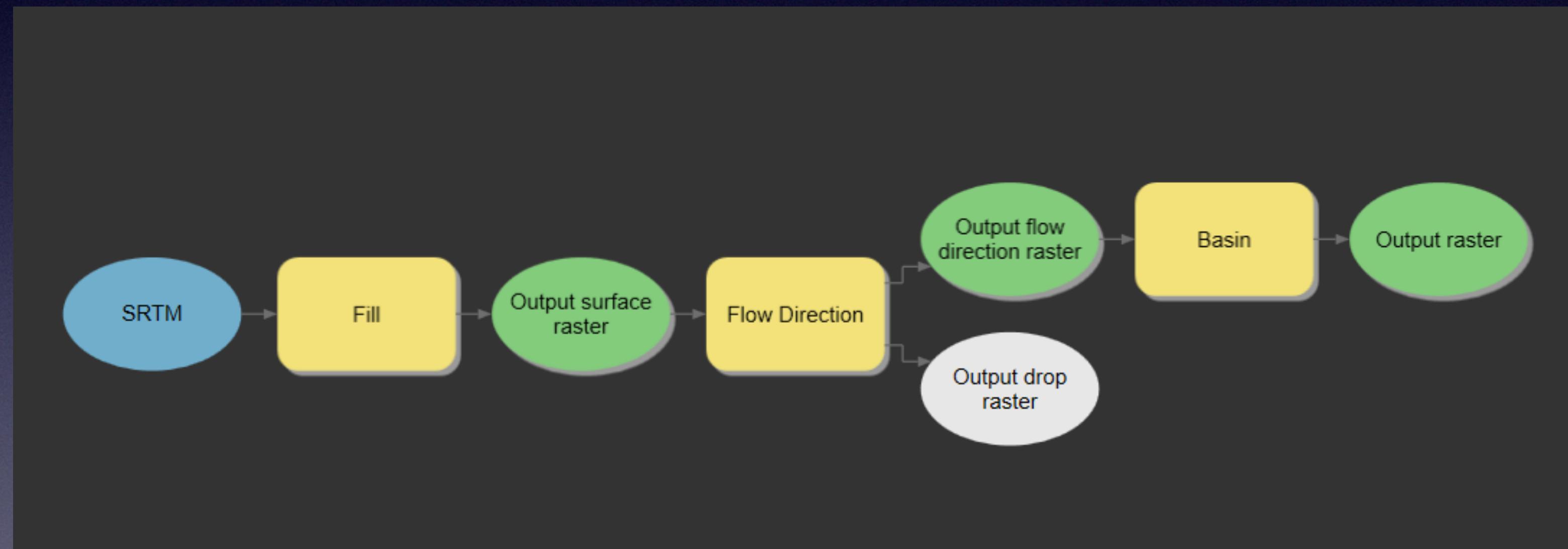
Model Builder

- For those who are not programmers there is model builder
- It is visual programming environment within ArcGIS Pro
- In Desktop you can even models export into Python

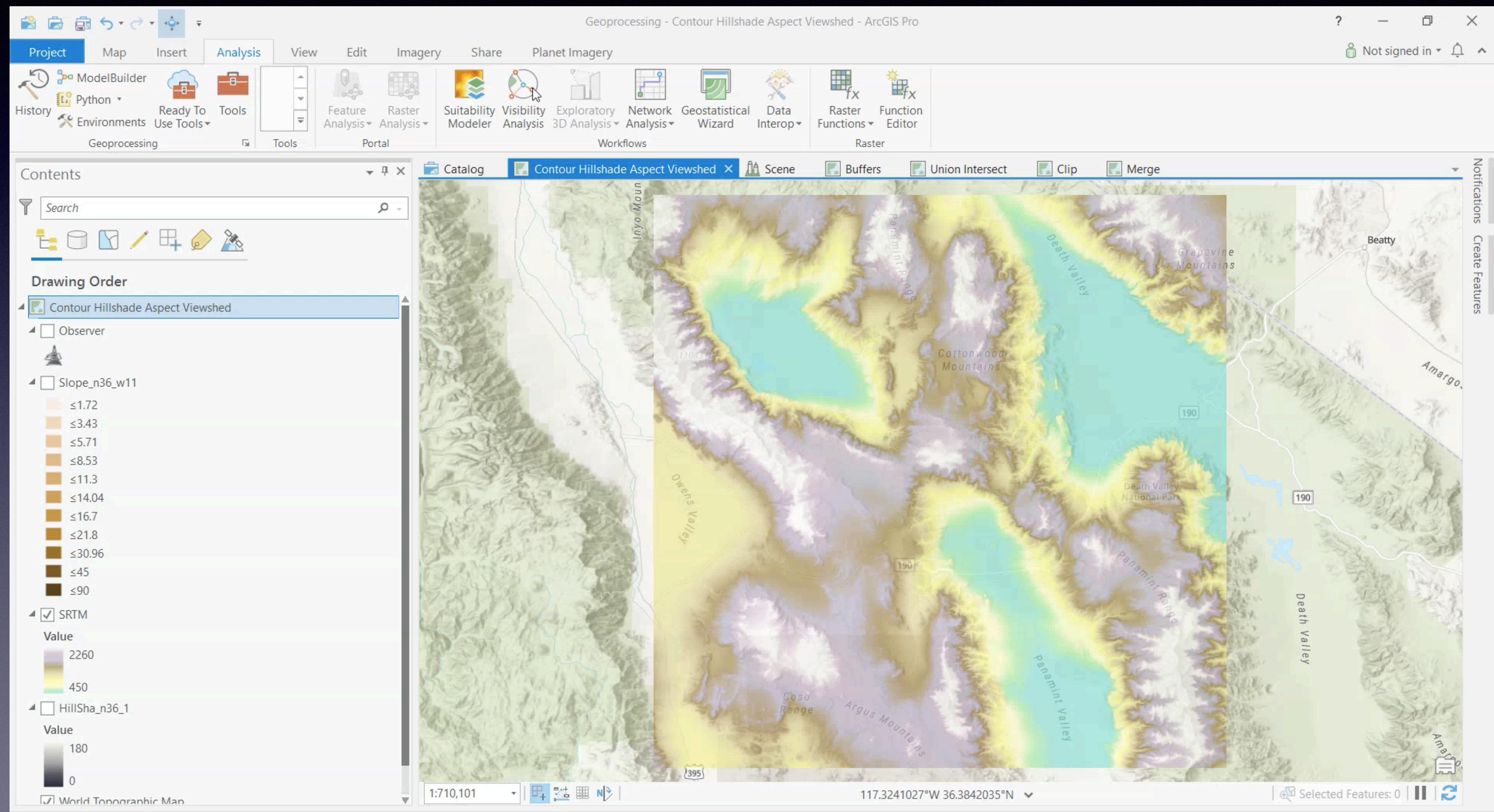
Hands on with Model Builder

- We will now create a Basin model for the SRTM data
- We will need the Fill, Flow Direction, and Basin Tools
- We will also add the final raster to our map display

Hands on with Model Builder



Model Builder



Discussion Assignment

- Post a screenshot result from one of the tools in the discussion board for this week