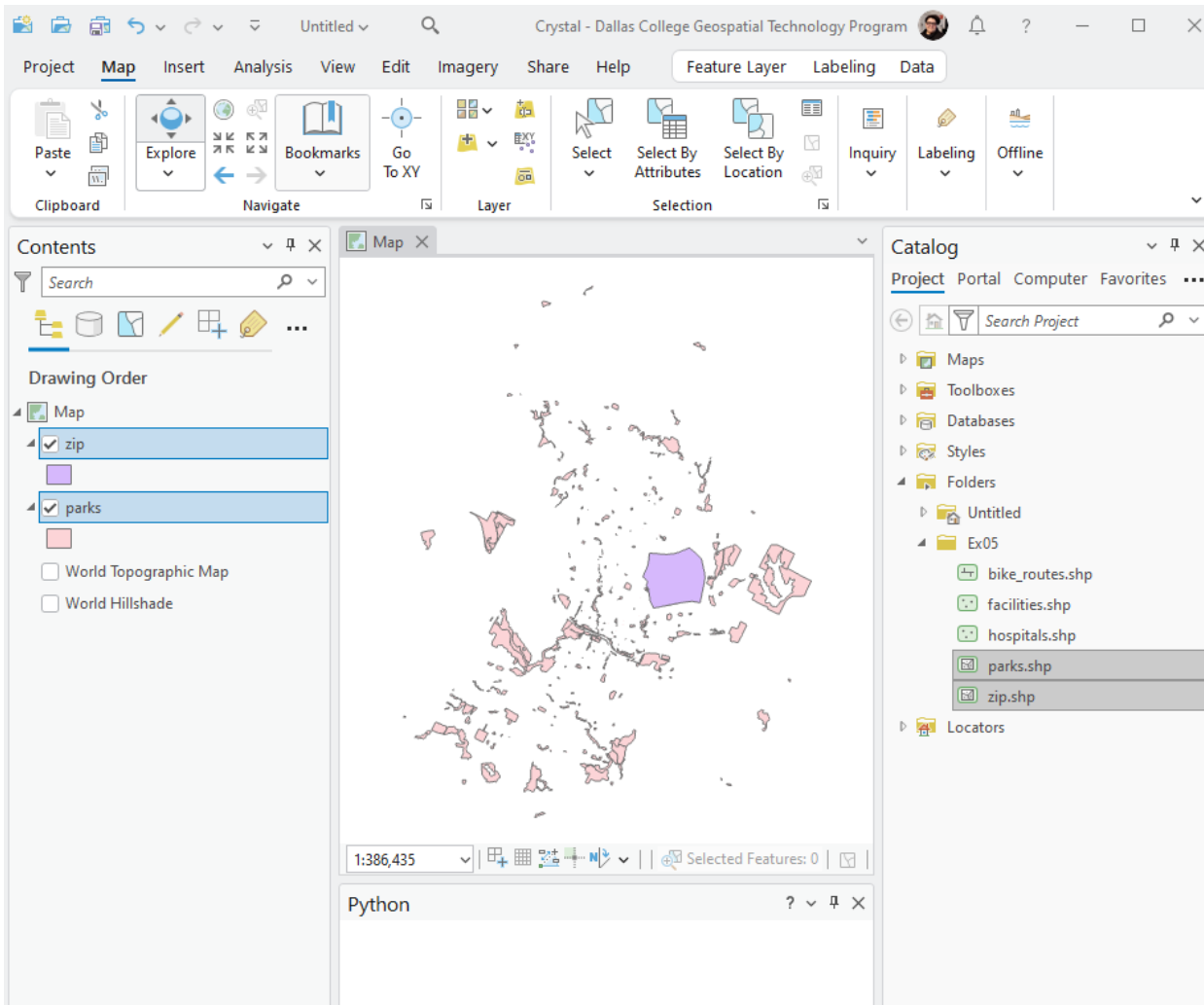


## Week 6 Chapter 5

Lab materials saved on GitHub in GISC2335\_ProgrammingForGIS/WeeklyContent/week6

### Lab 5: GEOPROCESSING USING PYTHON

#### Use tools



Python

```
arcpy.Clip_analysis("parks", "zip", r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_clip.shp")
```

Python

```
arcpy.Clip_analysis("parks", "zip", r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_clip.shp")<Result 'C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_clip.shp'>
```

Contents

Search

Drawing Order

Map

✓ parks\_clip

✓ zip

✓ parks

☐ World Topographic Map

☐ World Hillshade

Map

1:386,435

Selected Features: 0

Python

```
arcpy.Clip_analysis("parks", "zip", r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_clip.shp")<Result 'C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_clip.shp'>arcpy.env.workspace = r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05"
```

Catalog

Project Portal Computer Favorites

Search Project

Maps

Toolboxes

Databases

Styles

Folders

Untitled

Ex05

bike\_routes.shp

facilities.shp

hospitals.shp

parks.shp

parks\_clip.shp

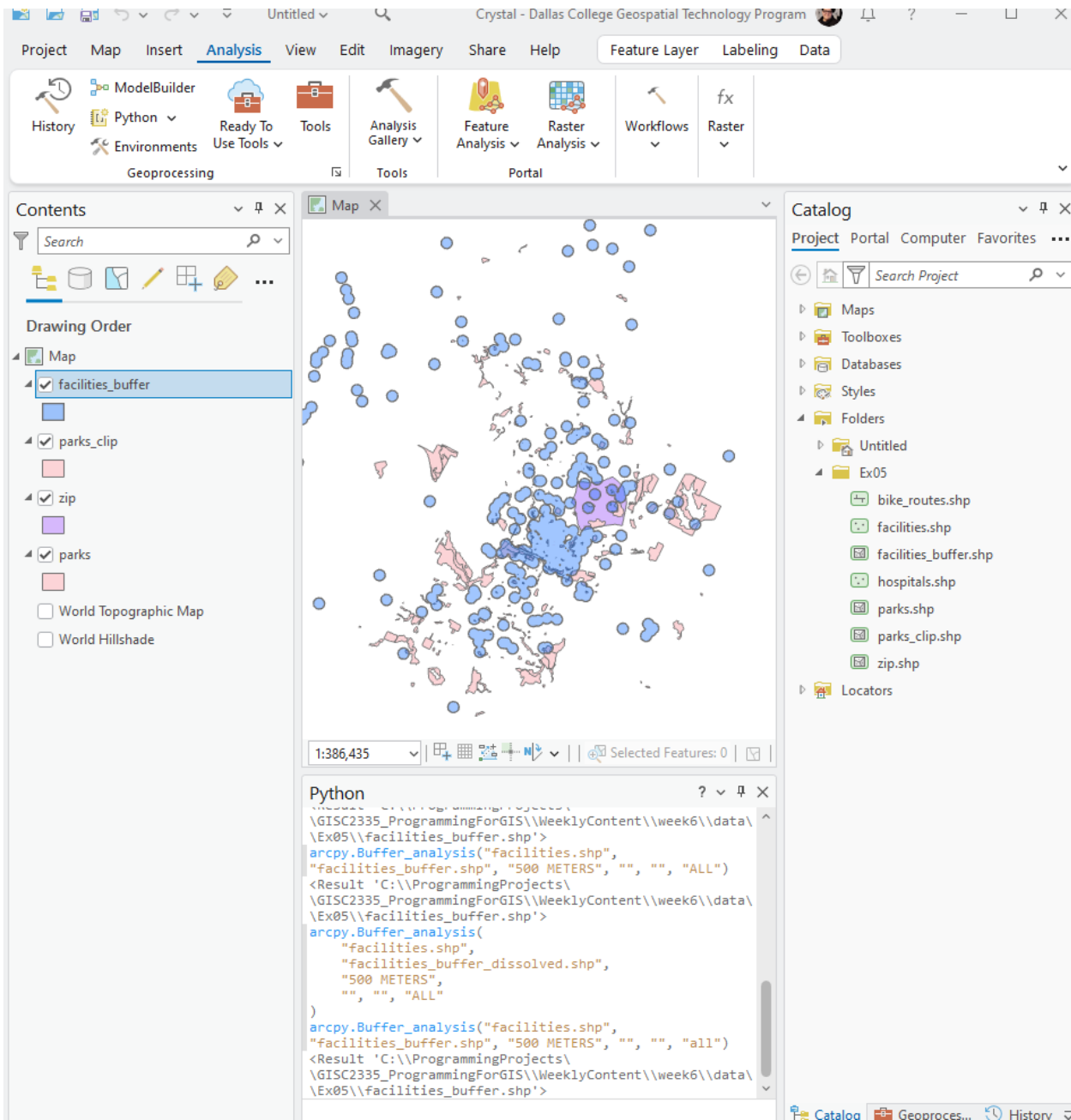
zip.shp

Locators

The screenshot displays the ArcGIS Desktop interface. The main map window shows a distribution of blue points (likely facilities) overlaid on a pink-shaded area (likely parks). The interface includes several panels:

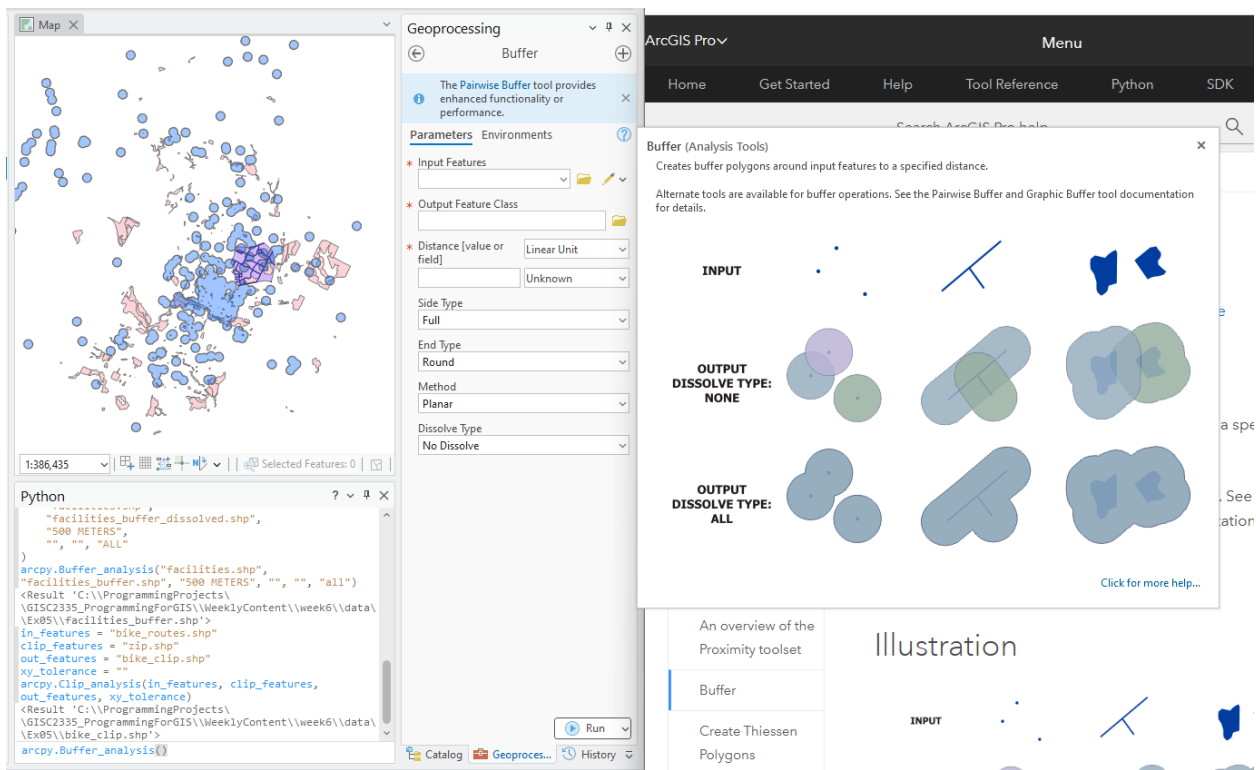
- Contents:** Located on the left, it shows the layer stack. The layers are: facilities\_buffer (blue square), parks\_clip (pink square), zip (purple square), and parks (pink square). Below the layers, there are checkboxes for "World Topographic Map" and "World Hillshade", both of which are currently unchecked.
- Map:** The central map window displays the spatial data. The scale bar at the bottom indicates a scale of 1:386,435.
- Catalog:** Located on the right, it shows the project structure. The "Ex05" folder is selected, containing several shapefiles: bike\_routes.shp, facilities.shp, facilities\_buffer.shp, hospitals.shp, parks.shp, parks\_clip.shp, and zip.shp.
- Python:** A script window at the bottom shows the execution of ArcPy commands. The script performs a clip analysis on parks and a buffer analysis on facilities.

```
arcpy.Clip_analysis("parks", "zip", r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_clip.shp")
<Result 'C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_clip.shp'>
arcpy.env.workspace = r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05"
arcpy.Buffer_analysis("facilities.shp", "facilities_buffer.shp", "500 METERS")
<Result 'C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\facilities_buffer.shp'>
```



The screenshot displays the QGIS desktop environment. On the left, the 'Contents' panel lists the following layers: 'bike\_clip' (selected), 'facilities\_buffer', 'parks\_clip', 'zip', 'parks', 'World Topographic Map', and 'World Hillshade'. Each layer has a corresponding color swatch. The main map window shows a geographic area with blue points, pink polygons, and a purple polygon. The scale bar at the bottom of the map window indicates 1:386,435. Below the map window, the 'Python' console shows the following code and output:

```
Python
    facilities_buffer_dissolved.shp",
    "500 METERS",
    "", "", "ALL"
)
arcpy.Buffer_analysis("facilities.shp",
"facilities_buffer.shp", "500 METERS", "", "", "all")
<Result 'C:\\ProgrammingProjects\\
\\GISC2335_ProgrammingForGIS\\WeeklyContent\\week6\\data\\
\\Ex05\\facilities_buffer.shp'>
in_features = "bike_routes.shp"
clip_features = "zip.shp"
out_features = "bike_clip.shp"
xy_tolerance = ""
arcpy.Clip_analysis(in_features, clip_features,
out_features, xy_tolerance)
<Result 'C:\\ProgrammingProjects\\
\\GISC2335_ProgrammingForGIS\\WeeklyContent\\week6\\data\\
\\Ex05\\bike_clip.shp'>
```



## Explore ArcPy functions and classes

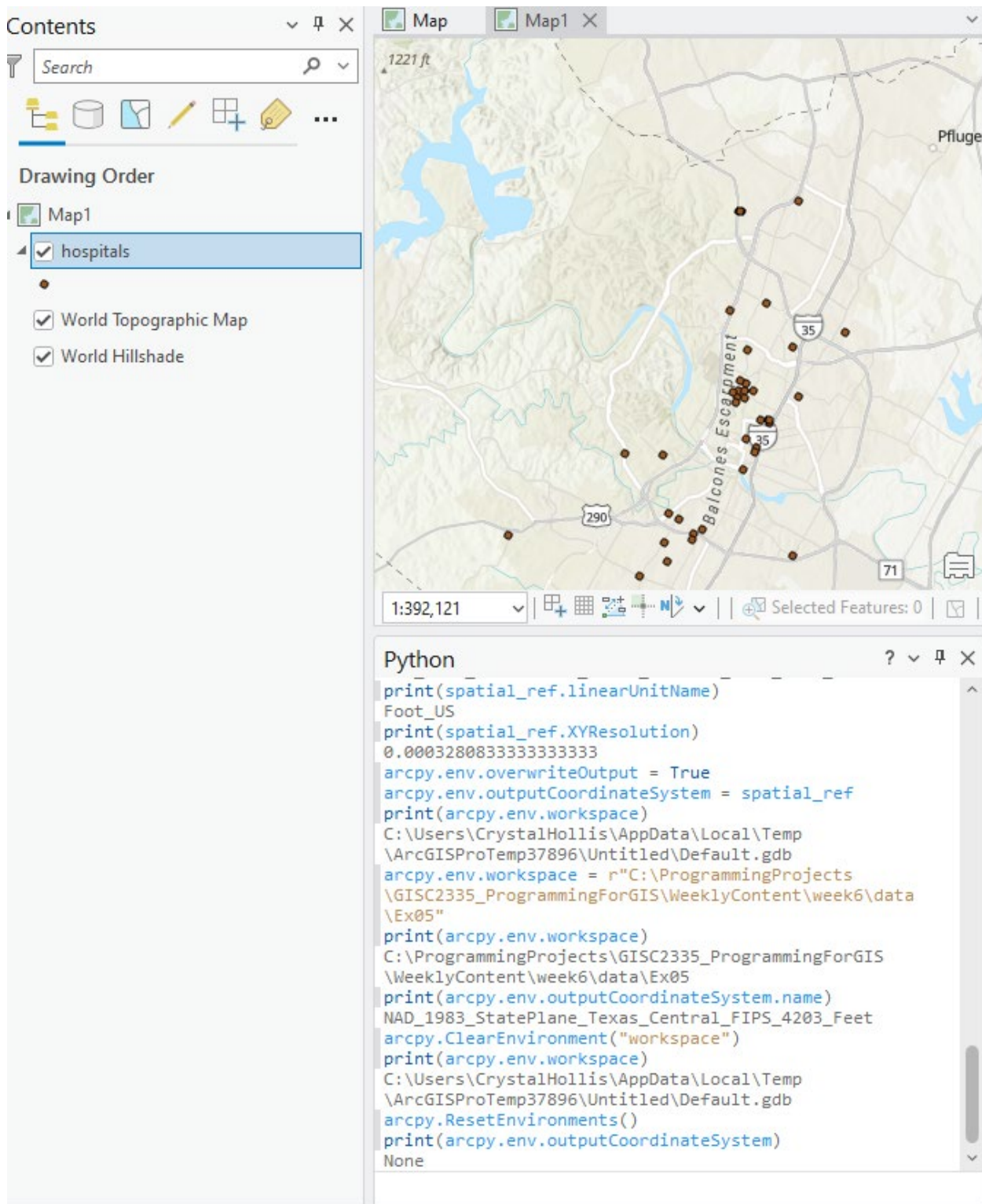
```
\Ex05\bike_clip.shp">
arcpy.Exists("hospitals.shp")
False
arcpy.env.workspace = r"C:\ProgrammingProjects\
GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\
Ex05"
arcpy.Exists("hospitals.shp")
True
```

```
arcpy.Usage("Clip_analysis")
'Clip_analysis(in_features, clip_features,
out_feature_class, {cluster_tolerance})'
arcpy.Usage("Clip")
'Method Clip not found. Choices: Method Clip not unique,
please use ToolboxName_ToolName.'
arcpy.Usage("Exists")
'exists(<dataset>, {datatype}) -> boolean\nCheck if a
data element exists.'
```

The screenshot displays the ArcGIS Desktop interface. On the left, the 'Contents' pane shows a map named 'Map1' with a layer 'hospitals' selected. Below it, 'World Topographic Map' and 'World Hillshade' are also checked. The main map area shows a topographic map of a region including Cedar Park, Round Rock, and Pflugerville, with numerous brown dots representing hospitals. The map scale is 1:392,121. At the bottom, the Python console window is open, showing a script that defines a spatial reference for the 'hospitals' layer.

```
Python
'Method Clip not found. Choices: Method Clip not unique,
please use ToolboxName_ToolName.'
arcpy.Usage("Exists")
'exists(<dataset>, {datatype}) -> boolean\nCheck if a
data element exists.'
prjfile = r"C:\ProgrammingProjects
\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data
\Ex05\facilities.prj"
spatial_ref = arcpy.SpatialReference(prjfile)
arcpy.DefineProjection_management("hospitals",
spatial_ref)
<Result 'hospitals'>
print(spatial_ref.name)
NAD_1983_StatePlane_Texas_Central_FIPS_4203_Feet
print(spatial_ref.linearUnitName)
Foot_US
print(spatial_ref.XYResolution)
0.000328083333333333
```



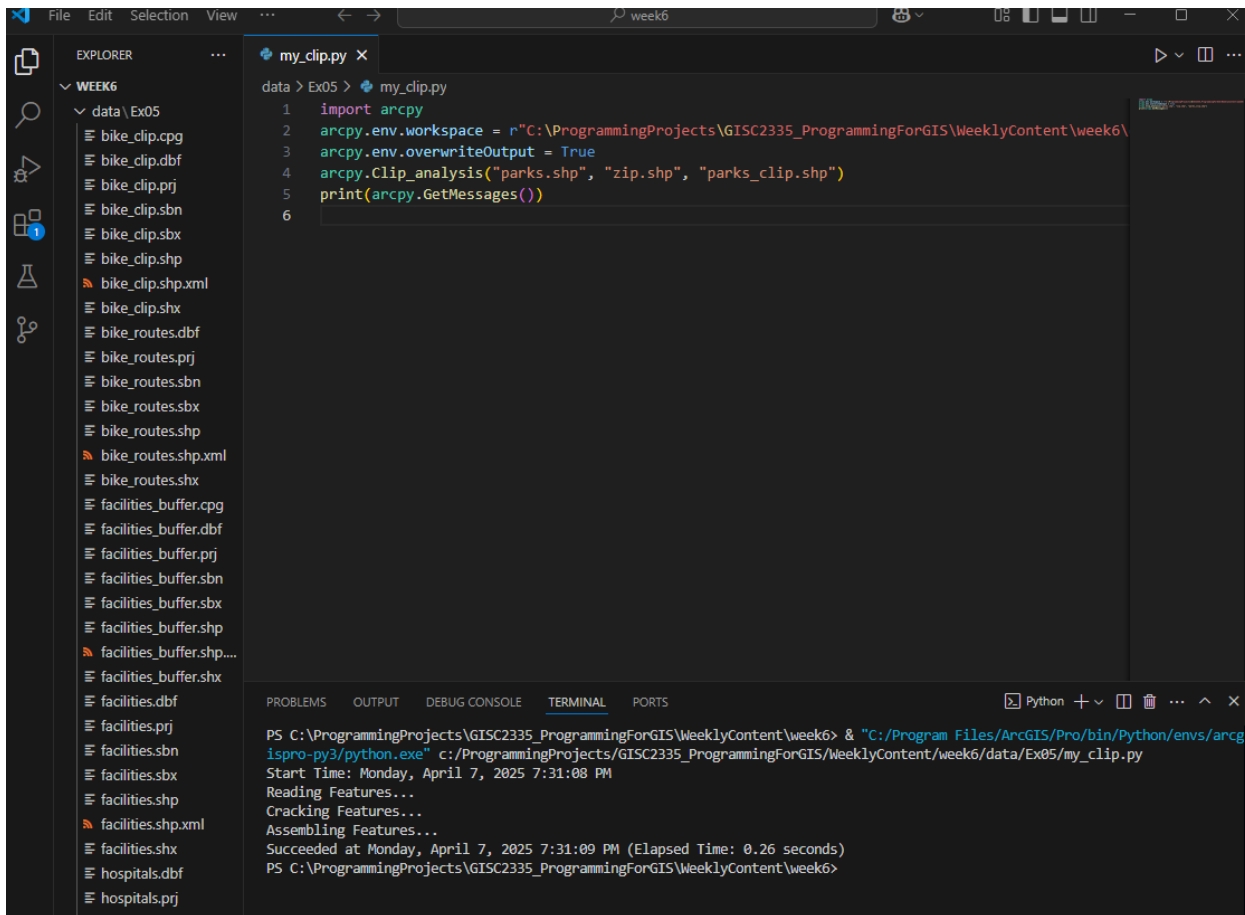


The screenshot displays the ArcGIS Pro interface. On the left, the 'Contents' pane shows a map named 'Map1' with a layer 'hospitals' selected. The map area shows a topographic view of a region in Texas, including the Balcones Escarpment and major roads like US-290, US-35, and US-71. The scale bar indicates 1:392,121. The Python console at the bottom shows the following code and its output:

```
print(spatial_ref.linearUnitName)
Foot_US
print(spatial_ref.XYResolution)
0.000328083333333333
arcpy.env.overwriteOutput = True
arcpy.env.outputCoordinateSystem = spatial_ref
print(arcpy.env.workspace)
C:\Users\CrystalHollis\AppData\Local\Temp\ArcGISProTemp37896\Untitled\Default.gdb
arcpy.env.workspace = r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05"
print(arcpy.env.workspace)
C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05
print(arcpy.env.outputCoordinateSystem.name)
NAD_1983_StatePlane_Texas_Central_FIPS_4203_Feet
arcpy.ClearEnvironment("workspace")
print(arcpy.env.workspace)
C:\Users\CrystalHollis\AppData\Local\Temp\ArcGISProTemp37896\Untitled\Default.gdb
arcpy.ResetEnvironments()
print(arcpy.env.outputCoordinateSystem)
None
```

## Work with tool messages



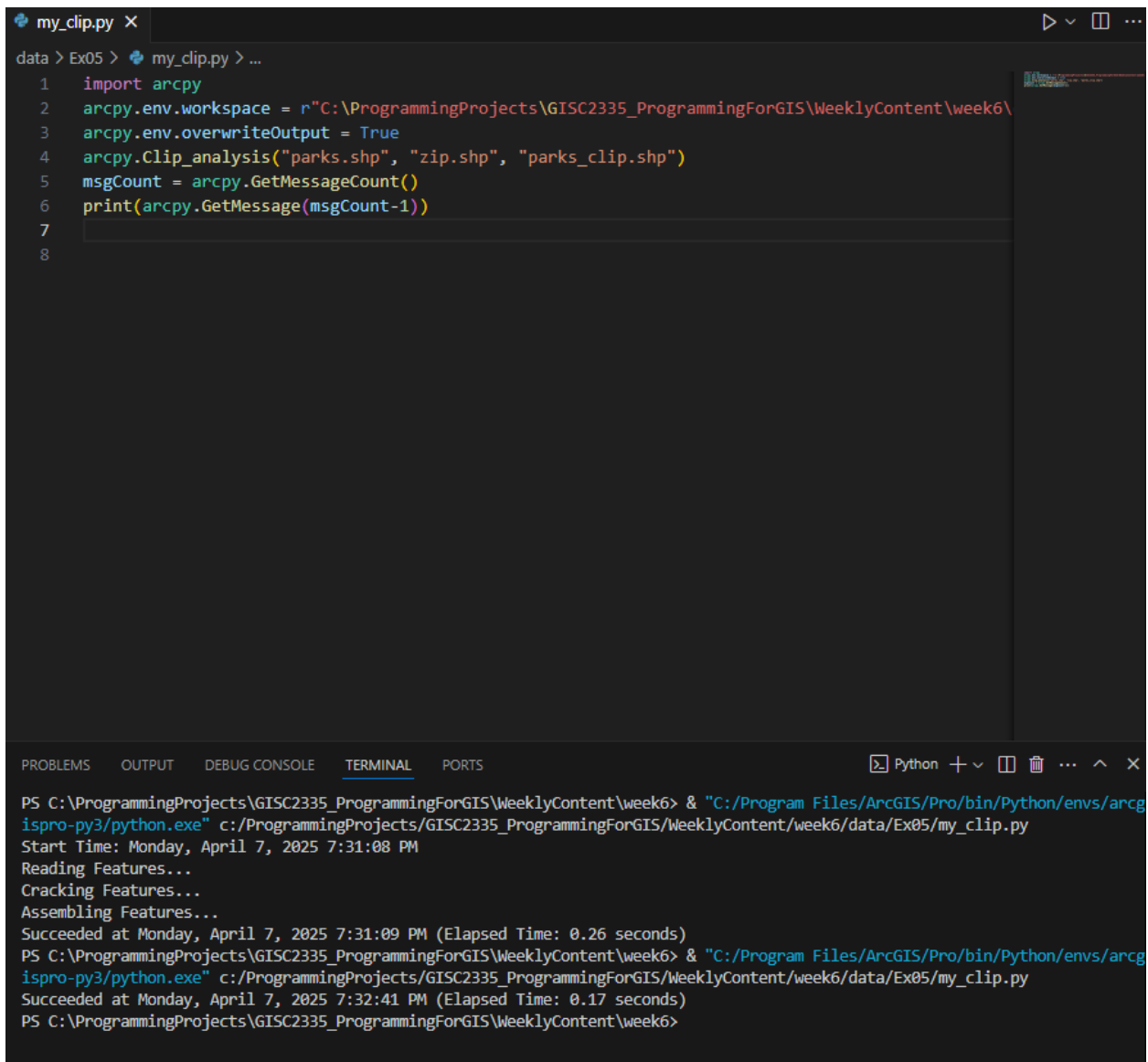


The screenshot shows a code editor with a file explorer on the left and a terminal at the bottom. The file explorer shows a project named 'WEEK6' with a subfolder 'data' containing a file 'Ex05'. The file 'my\_clip.py' is open in the editor. The code in 'my\_clip.py' is as follows:

```
1 import arcpy
2 arcpy.env.workspace = r"C:\ProgrammingProjects\GISC2335_ProgrammingForGIS\WeeklyContent\week6\
3 arcpy.env.overwriteOutput = True
4 arcpy.Clip_analysis("parks.shp", "zip.shp", "parks_clip.shp")
5 print(arcpy.GetMessages())
6
```

The terminal at the bottom shows the command prompt running the script. The output is as follows:

```
PS C:\ProgrammingProjects\GISC2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/my_clip.py
Start Time: Monday, April 7, 2025 7:31:08 PM
Reading Features...
Cracking Features...
Assembling Features...
Succeeded at Monday, April 7, 2025 7:31:09 PM (Elapsed Time: 0.26 seconds)
PS C:\ProgrammingProjects\GISC2335_ProgrammingForGIS\WeeklyContent\week6>
```

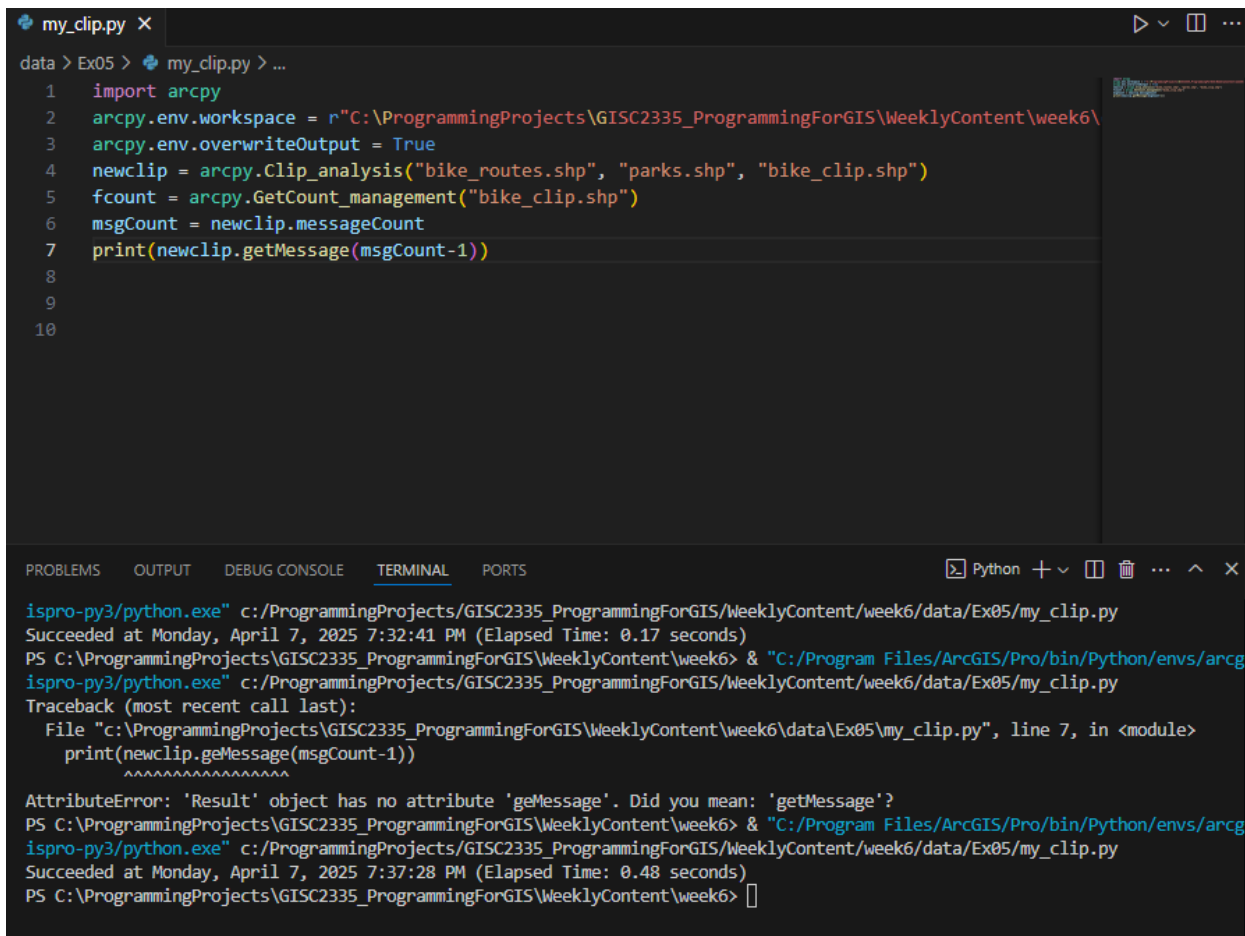


The image shows a screenshot of a code editor and a terminal window. The code editor at the top displays a Python script named `my_clip.py` with the following content:

```
1 import arcpy
2 arcpy.env.workspace = r"C:\ProgrammingProjects\GISC2335_ProgrammingForGIS\WeeklyContent\week6\
3 arcpy.env.overwriteOutput = True
4 arcpy.Clip_analysis("parks.shp", "zip.shp", "parks_clip.shp")
5 msgCount = arcpy.GetMessageCount()
6 print(arcpy.GetMessage(msgCount-1))
7
8
```

Below the code editor is a terminal window with the following output:

```
PS C:\ProgrammingProjects\GISC2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/my_clip.py
Start Time: Monday, April 7, 2025 7:31:08 PM
Reading Features...
Cracking Features...
Assembling Features...
Succeeded at Monday, April 7, 2025 7:31:09 PM (Elapsed Time: 0.26 seconds)
PS C:\ProgrammingProjects\GISC2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/my_clip.py
Succeeded at Monday, April 7, 2025 7:32:41 PM (Elapsed Time: 0.17 seconds)
PS C:\ProgrammingProjects\GISC2335_ProgrammingForGIS\WeeklyContent\week6>
```



The image shows a screenshot of a code editor and a terminal window. The code editor at the top displays a Python script named `my_clip.py` with the following content:

```
1 import arcpy
2 arcpy.env.workspace = r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\
3 arcpy.env.overwriteOutput = True
4 newclip = arcpy.Clip_analysis("bike_routes.shp", "parks.shp", "bike_clip.shp")
5 fcount = arcpy.GetCount_management("bike_clip.shp")
6 msgCount = newclip.messageCount
7 print(newclip.getMessage(msgCount-1))
8
9
10
```

The terminal window at the bottom shows the execution of the script. It starts with the command `ispro-py3/python.exe c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/my_clip.py`, which succeeds. Then, the command `PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/my_clip.py` is executed, resulting in a `Traceback (most recent call last):` error. The error message is:

```
File "c:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\my_clip.py", line 7, in <module>
    print(newclip.getMessage(msgCount-1))
            ^^^^^^^^^^^^^^^
AttributeError: 'Result' object has no attribute 'getMessage'. Did you mean: 'getMessage'?
```

The terminal then shows the command being executed again, which succeeds.

---

## Work with licenses

```
Python

print(arcpy.ProductInfo())
ArcInfo
arcpy.CheckProduct("arcinfo")
'AlreadyInitialized'
arcpy.CheckExtension("3d")
'Available'
arcpy.CheckExtension("business")
'NotLicensed'
```

```
centroid.py x
data > Ex05 > centroid.py > ...
1 import arcpy
2 arcpy.env.workspace = r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05"
3 arcpy.env.overwriteOutput = True # This is not in the lab instructions but I added this because I was getting an error since parks_centroid.shp already existed in my Ex05 folder.
4 in_fc = "parks.shp"
5 out_fc = "parks_centroid.shp"
6 if arcpy.ProductInfo() == "ArcInfo":
7     arcpy.FeatureToPoint_management(in_fc, out_fc)
8 else: print("An ArcInfo license is not available.")
9

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python + v ... ^ x
PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GIS2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/centroid.py
PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GIS2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/centroid.py
Traceback (most recent call last):
  File "c:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\centroid.py", line 6, in <module>
    arcpy.FeatureToPoint_management(in_fc, out_fc)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 6758, in FeatureToPoint
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 6754, in FeatureToPoint
    gp.FeatureToPoint_management(*gp_fixargs((in_features, out_feature_class, point_location), True))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing_base.py", line 532, in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
    ~~~~~~
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000725: Output Feature Class: Dataset C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_centroid.shp already exists.
Failed to execute (FeatureToPoint).

PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GIS2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/centroid.py
PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6>
```

```
centroid.py
data > Ex05 > centroid.py > ...
1 import arcpy
2 arcpy.env.workspace = r"C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05"
3 arcpy.env.overwriteOutput = True # This is not in the lab instructions but I added this because I was getting an error since parks_centroid.shp already existed in my Ex05 folder.
4 in_fc = "parks.shp"
5 out_fc = "parks_centroid.shp"
6 if arcpy.ProductInfo() == "ArcInfo":
7     arcpy.FeatureToPoint_management(in_fc, out_fc)
8     print("Your System has the correct ArcGIS license installed. The Centroid Clip is in the Ex05 folder.") # Prints message confirming license and Clip Output.
9 else: print("An ArcInfo license is not available.")
10

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python + - - - - - X

PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/centroid.py
PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/centroid.py
Traceback (most recent call last):
  File "c:/ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\centroid.py", line 6, in <module>
    arcpy.FeatureToPoint_management(in_fc, out_fc)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 6758, in FeatureToPoint
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 6754, in FeatureToPoint
    gp.FeatureToPoint_management(*gp_fixargs((in_features, out_feature_class, point_location), True))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing_base.py", line 532, in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
    ~~~~~
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000725: Output Feature Class: Dataset C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data\Ex05\parks_centroid.shp already exists.
Failed to execute (FeatureToPoint).

PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/centroid.py
PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> & "C:/Program Files/ArcGIS/Pro/bin/Python/envs/arcgispro-py3/python.exe" c:/ProgrammingProjects/GISC2335_ProgrammingForGIS/WeeklyContent/week6/data/Ex05/centroid.py
Your System has the correct ArcGIS license installed. The Centroid Clip is in the Ex05 folder.
PS C:\ProgrammingProjects\GIS2335_ProgrammingForGIS\WeeklyContent\week6> []
```