

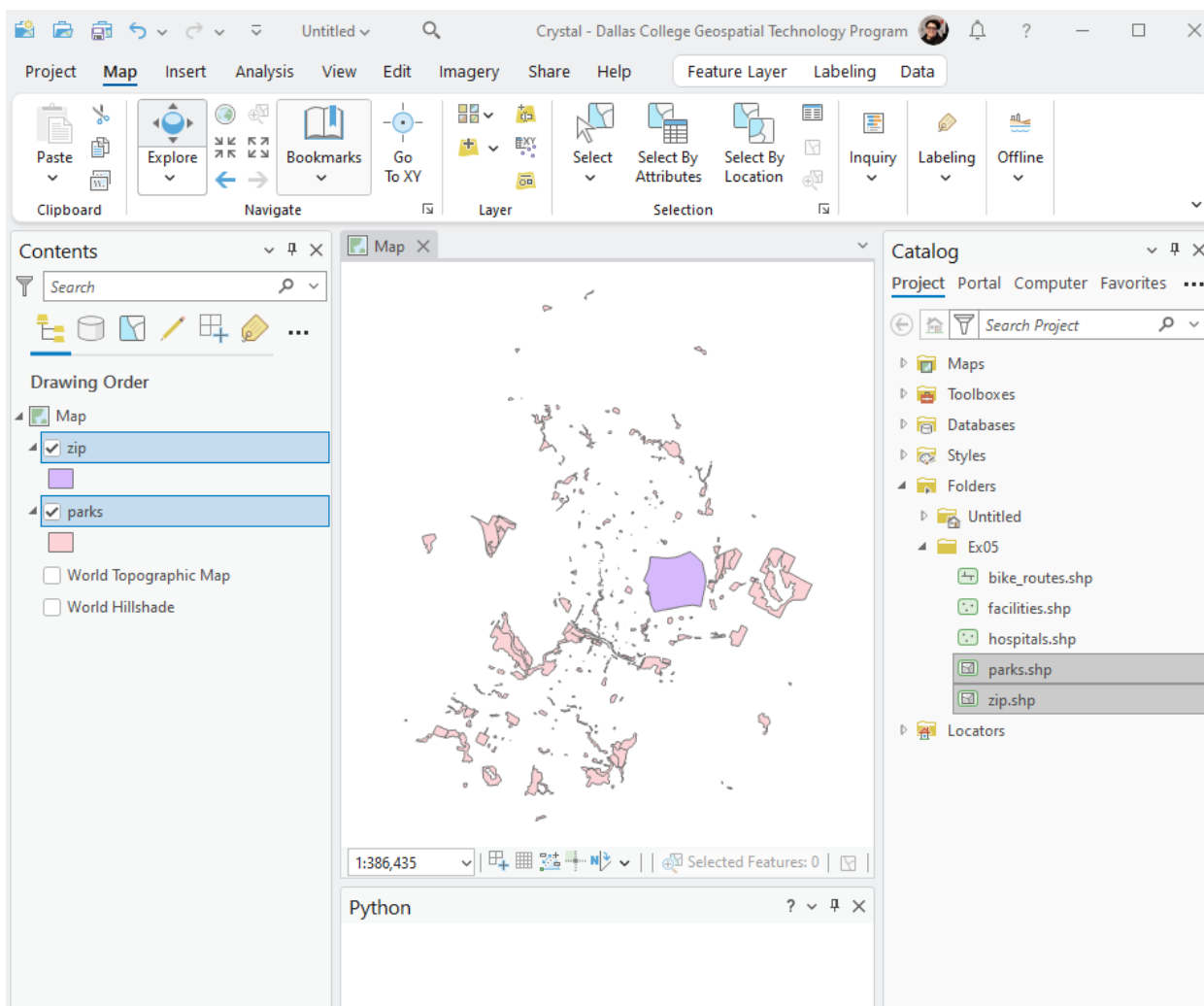
Week 6 Chapter 5

Lab materials saved on GitHub in GISC2335_ProgrammingForGIS/WeeklyContent/week6

https://github.com/crystaljhollis/DallasCollege_Portfolio/tree/main/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

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

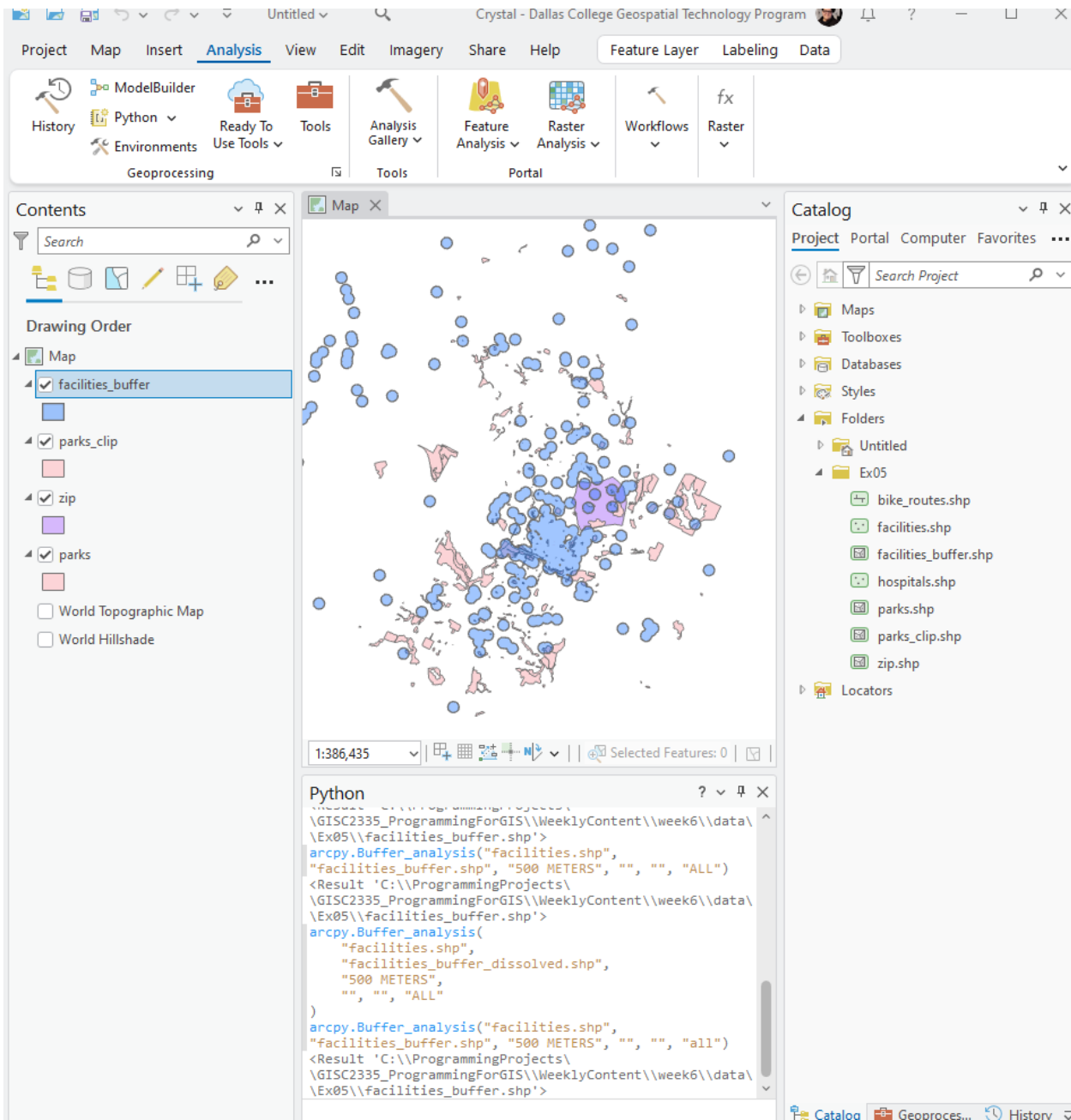
zip.shp

Locators

The screenshot displays a GIS application interface with four main panels:

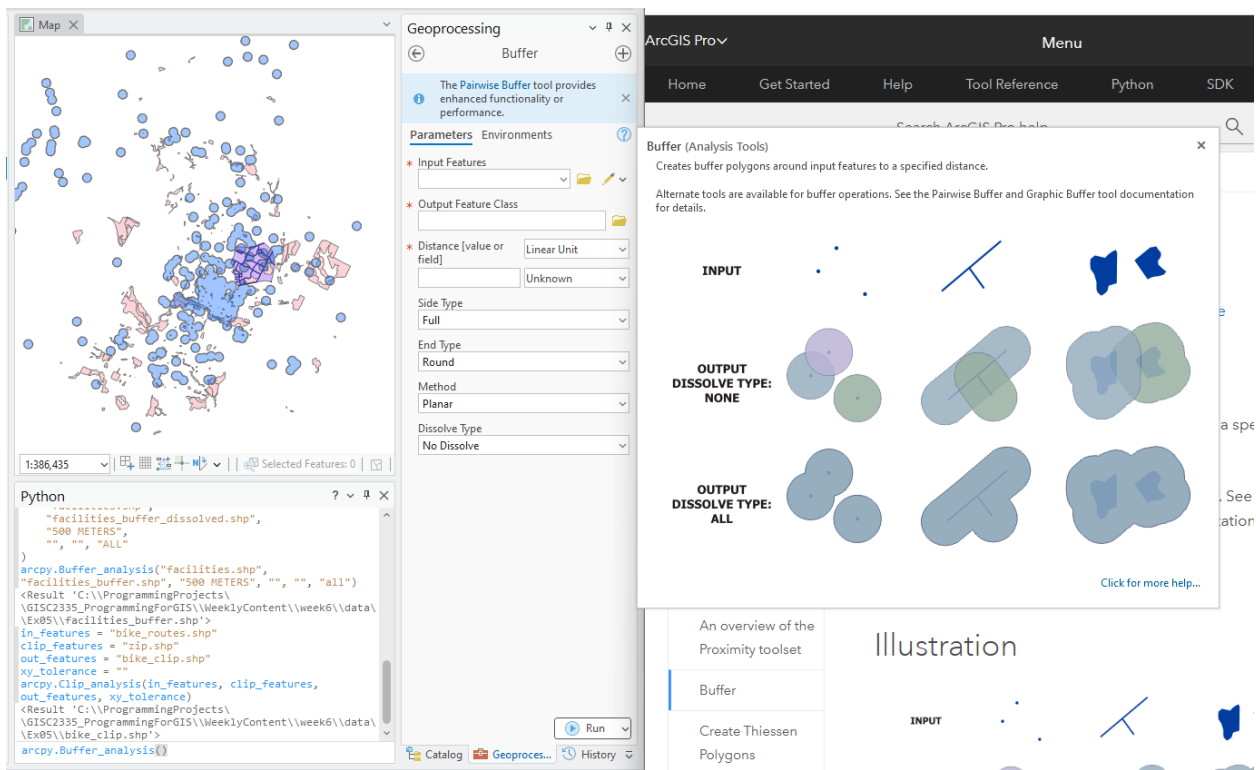
- Contents Panel (Left):** Shows the drawing order of layers. The layers are:
 - Map
 - facilities_buffer (blue circles)
 - parks_clip (pink polygons)
 - zip (purple polygons)
 - parks (pink polygons)Below the layers, there are checkboxes for "World Topographic Map" and "World Hillshade", both of which are currently unchecked.
- Map Panel (Center):** Displays a map of a region with numerous blue circular points (facilities_buffer) overlaid on pink polygonal areas (parks_clip and parks). The scale bar at the bottom indicates 1:386,435.
- Catalog Panel (Right):** Shows the project structure. Under the "Ex05" folder, the following files are listed:
 - bike_routes.shp
 - facilities.shp
 - facilities_buffer.shp
 - hospitals.shp
 - parks.shp
 - parks_clip.shp
 - zip.shp
- Python Panel (Bottom):** Contains a Python script that performs a clip analysis and a buffer analysis. The script is as follows:

```
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' (blue), 'facilities_buffer' (blue), 'parks_clip' (pink), 'zip' (purple), and 'parks' (pink). Below these are 'World Topographic Map' and 'World Hillshade'. The main map window shows a geographic area with blue points, pink polygons, and purple polygons. At the bottom, 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\\
\\GIS2335_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\\
\\GIS2335_ProgrammingForGIS\\WeeklyContent\\week6\\data\\
\\Ex05\\bike_clip.shp'>
```



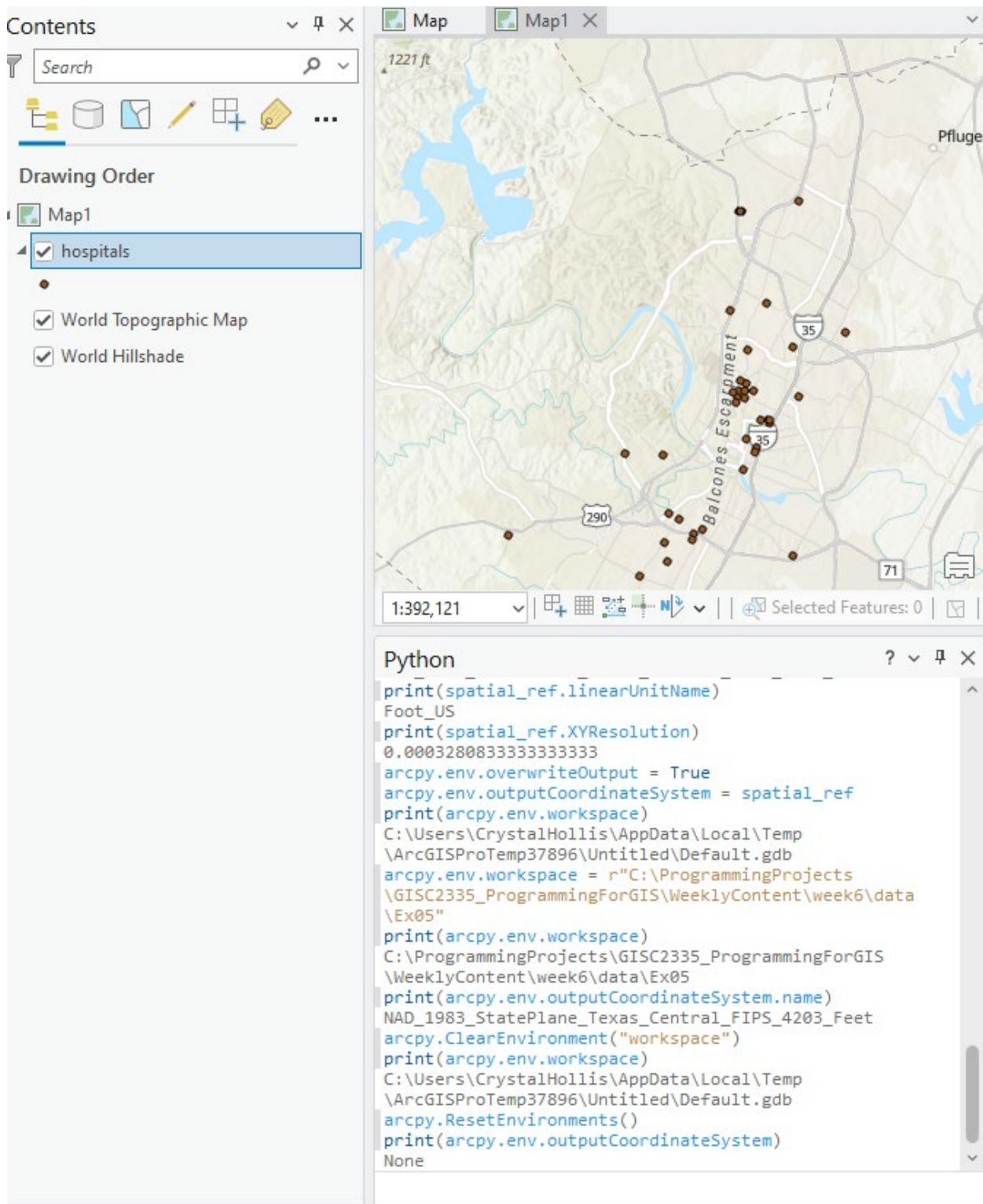
Explore ArcPy functions and classes

```
\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.

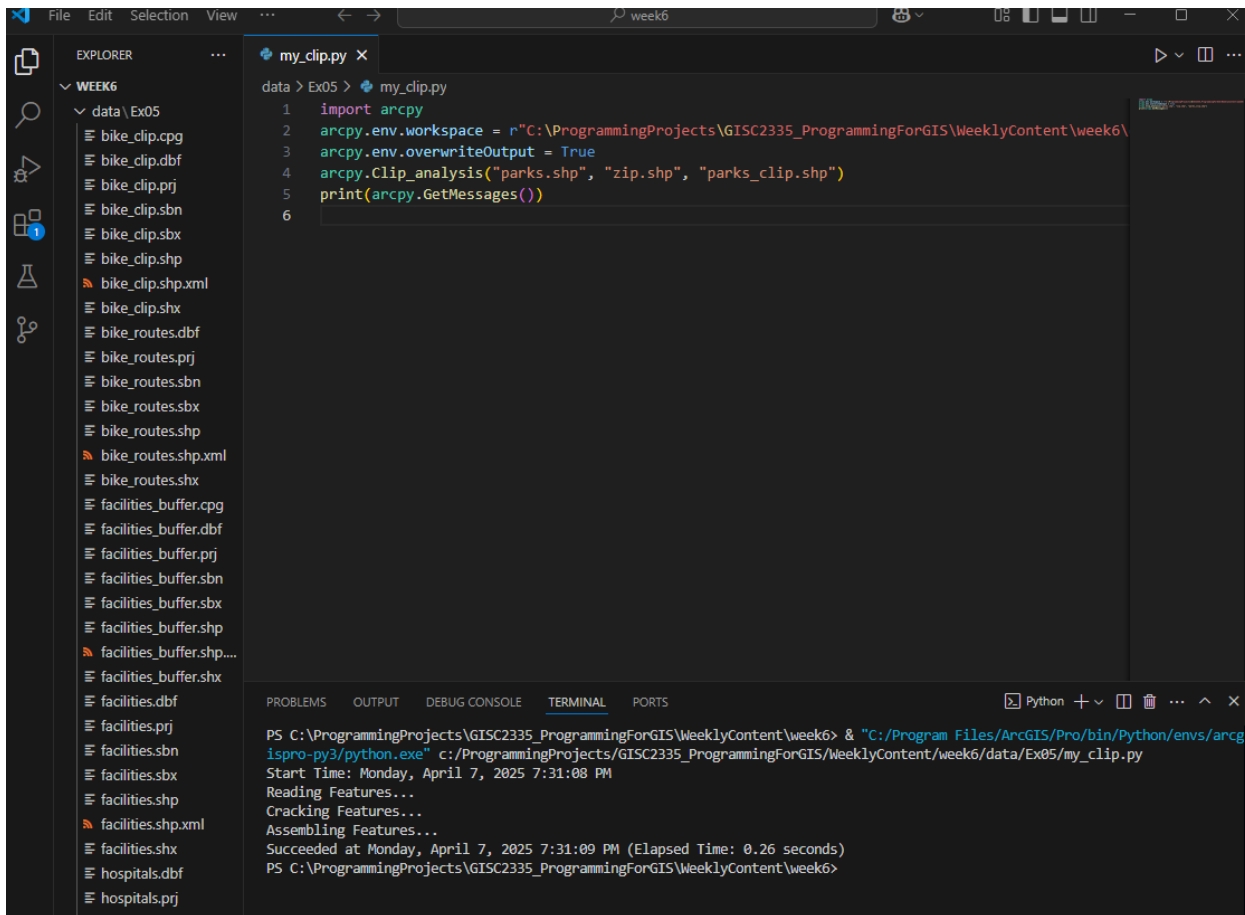
```
Python
'Method Clip not found. Choices: Method Clip not unique,
please use ToolboxName_ToolName.'
arcpy.Usage("Exists")
'exists(<dataset>, {datatype}) -> boolean\nCheck if a
data element exists.'
prjfile = r"C:\ProgrammingProjects
\GIS2335_ProgrammingForGIS\WeeklyContent\week6\data
\Ex05\facilities.prj"
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:

```
Python
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



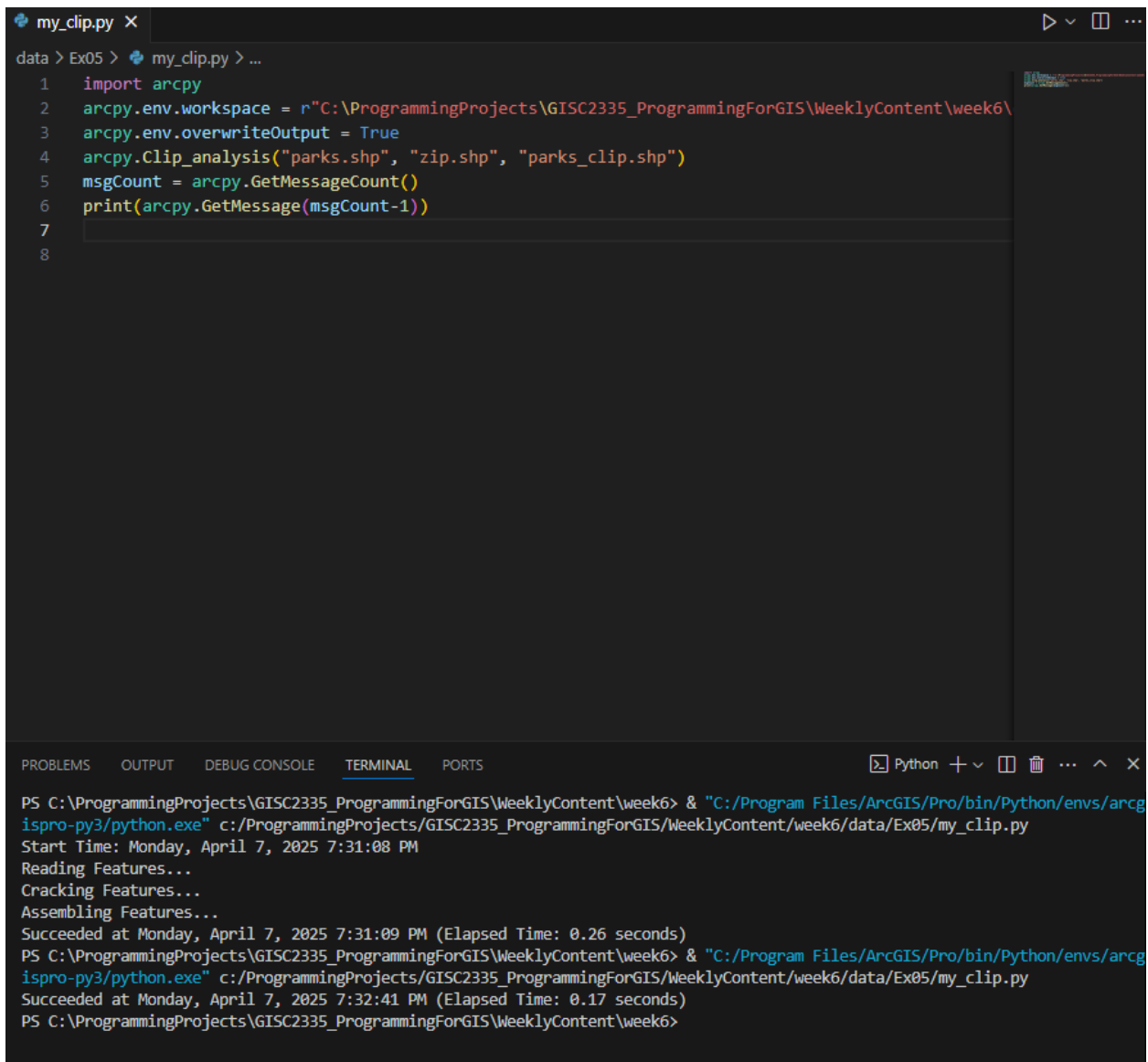
The screenshot displays a Python IDE interface. On the left, the EXPLORER pane shows a project structure with a folder named 'WEEK6' containing a subfolder 'data' and a file 'Ex05'. The 'data' folder contains various GIS files including 'bike_clip.cpg', 'bike_clip.dbf', 'bike_clip.prj', 'bike_clip.sbn', 'bike_clip.sbx', 'bike_clip.shp', 'bike_clip.shp.xml', 'bike_routes.dbf', 'bike_routes.prj', 'bike_routes.sbn', 'bike_routes.sbx', 'bike_routes.shp', 'bike_routes.shp.xml', 'bike_routes.shx', 'facilities_buffer.cpg', 'facilities_buffer.dbf', 'facilities_buffer.prj', 'facilities_buffer.sbn', 'facilities_buffer.sbx', 'facilities_buffer.shp', 'facilities_buffer.shp.xml', 'facilities_buffer.shx', 'facilities.dbf', 'facilities.prj', 'facilities.sbn', 'facilities.sbx', 'facilities.shp', 'facilities.shp.xml', 'facilities.shx', 'hospitals.dbf', and 'hospitals.prj'.

The main editor pane shows a file named 'my_clip.py' with the following Python code:

```
1 import arcpy
2 arcpy.env.workspace = r"C:\ProgrammingProjects\GIS2335_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 bottom pane is the TERMINAL, showing the command prompt output for running the script:

```
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
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\GIS2335_ProgrammingForGIS\WeeklyContent\week6>
```

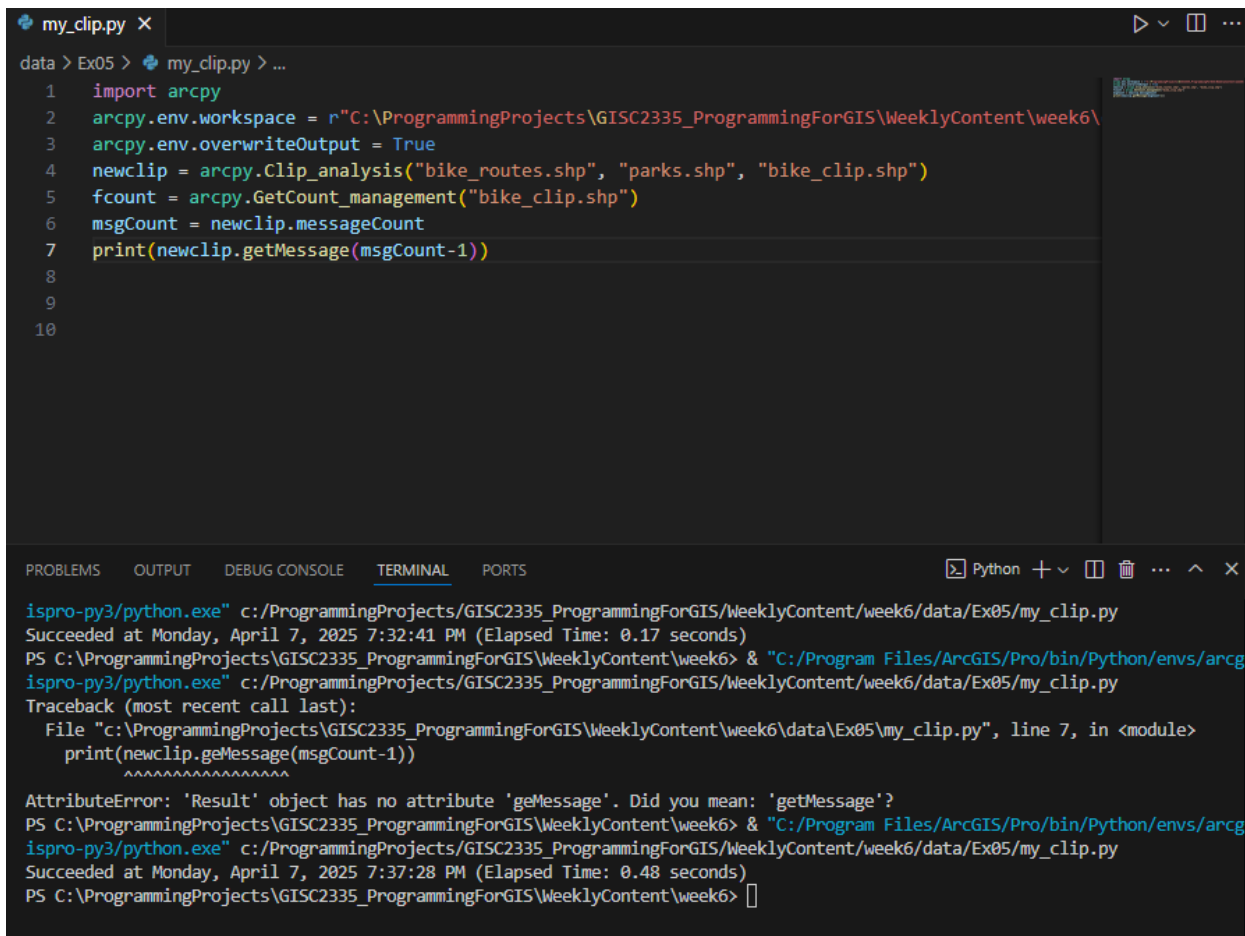


The image shows a screenshot of a code editor and a terminal window. The code editor at the top displays a Python script named `my_clip.py` with the following content:

```
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 screenshot shows a Python IDE with a file named `my_clip.py` open. The script contains the following code:

```
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 IDE's terminal window 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 run, 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 also shows the command being run again and succeeding.

Work with licenses

```
Python

print(arcpy.ProductInfo())
ArcInfo
arcpy.CheckProduct("arinfo")
'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> []
```