

# **Introduction to Geoprocessing Scripts Using Python®**

Student Edition

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## Course introduction

- Introduction
- Course goals
- Additional resources
- Installing the course data
- Icons used in this workbook
- Understanding the ArcGIS Platform

## 1 Running scripts in Python

- Lesson introduction
- Understanding Python fundamentals
- Integrated Development Environment (IDE)
- Running scripts in Python window
- Exercise 1A: Use the PyScripter IDE
  - Open and configure PyScripter
  - Run the script
- The ArcPy site package
- ArcPy functions and classes
- The ArcPy modules
- Choosing a scripting environment
- Tips and best practices
- Exercise 1B: Run scripts in Python
  - Buffer schools in Python window
  - Update script in PyScripter
  - Verify results in ArcMap
- Lesson review

## 2 Describing data

- Lesson introduction
- The Describe function
- Generic Describe object properties
- Feature class Describe properties
- Raster Describe properties
- Describing a feature class and raster
- Fill-in-the-blank
- Exercise 2: Work with the Describe object
  - Describe a feature class and a geodatabase
  - Describe a list of feature classes
  - Clip raster datasets with Describe object properties
  - Challenge: Describe dataset and coordinate system properties
- Lesson review

## 3 Automating scripts with lists

- Lesson introduction
- The ArcPy List functions
- Explore the ArcPy List functions
- Working with List functions
- Working with da.Walk
- List data
- Exercise 3: Automate scripts with the ArcPy List functions
  - List field properties
  - Buffer feature classes
  - Verify script results
- Lesson review

## 4 Working with selections

- Lesson introduction
- Selection tools in ArcMap
- Terms commonly used when working with selections
- Tools that accept feature layers
- Working with a selection
- The MakeFeatureLayer tool
- The FieldInfo object
- The AddFieldDelimiters function
- Determining a workflow
- Create a feature layer and get feature count
- Exercise 4: Work with feature layers and selections
  - Create new script
  - Create feature layers
  - Perform spatial selection
  - Create feature class from selection
- Lesson review

## 5 Working with cursors

- Lesson introduction
- The arcpy.da cursors
- Exploring the data access cursors
- Tips and best practices for arcpy.da Cursors
- Using the SearchCursor
- Exercise 5A: Evaluate data with the SearchCursor
  - Work with the da.SearchCursor
- Using the UpdateCursor
- Exercise 5B: Alter existing data with the UpdateCursor
  - Work with the da.UpdateCursor
- Using the InsertCursor

- Exercise 5C: Work with the Insert cursor
  - Work with the `da.InsertCursor`
- Error handling with Python
- Error handling with the try-except statement
- (Optional) Using the `arcpy.da.Editor`
- Lesson review

## 6 Working with geometry objects

- Lesson introduction
- Creating geometry objects
- Creating Point geometry objects
- Creating Polyline geometry objects
- Creating Polygon geometry objects
- The geometry object
- Constructing multipart geometry
- Constructing multipart polygons
- Creating and updating feature geometry
- Using a geometry object with geoprocessing tools
- Accessing geometry objects
- Exercise 6: Work with geometry objects and cursors
  - Create geometry objects
  - Access Shape geometry
  - Update existing features
  - (Optional) Create new features
  - (Optional) Use a geometry object with a geoprocessing tool
- Lesson review

## 7 Sharing scripts

- Lesson introduction
- Terms commonly used when sharing scripts
- Scripting advantages in ArcMap
- Making scripts dynamic
- Debugging scripts in PyScripter
- Creating and sharing a script tool
- Advantages of attaching a script to a custom tool
- Using the Add Script wizard
- Running a script
- Sharing a script
- Plan out a project
- Exercise 7: Share scripts through geoprocessing packages
  - Add pseudocode to the script
  - Write script code
  - Attach script to custom tool
  - Run script in ArcMap

- Share results as a geoprocessing package
- Verify the geoprocessing package

Lesson review

## 8 Automating map production

Lesson introduction

The arcpy.mapping module

Terms commonly used when working with the arcpy.mapping module

Using the arcpy.mapping module to modify map document contents

Referencing the map document

Listing map document contents

Managing layers

Managing layout elements

Publishing maps

Exporting maps and reports

Migrating scripts to ArcGIS Pro

Customizing symbology for map layers

Exercise 8: Work with map document contents

- Access map document in ArcGIS for Desktop
- Access map document in script
- Update layer symbology
- Update layout text elements
- Verify changes in ArcGIS for Desktop
- Challenge: Automate script for multiple map documents

Lesson review

## Appendixes

Appendix A: Esri data license agreement

Appendix B: Answers to lesson review questions

- Lesson 1: Running scripts in Python
- Lesson 2: Describing data
- Lesson 3: Automating scripts with lists
- Lesson 4: Working with selections
- Lesson 5: Working with cursors
- Lesson 6: Working with geometry objects
- Lesson 7: Sharing scripts
- Lesson 8: Automating map production