Python - Raster Analysis (Session 1001 / 1187)

Goals of the workshop

- Identify when you may need more analysis capability than what the tool dialogs offer and when you might consider using Map Algebra.
- Present how Map Algebra has been integrated within Python and how to access it.
- Gain an understanding of the Map Algebra syntax and how to create expressions.
- Introduce you to some of the more complex functionality within Map Algebra.
- Explain when you may exceed the Map Algebra analysis capability and how to gain additional functionality within Python.
- Illustrate through the creation of an actual model how to implement a wide variety of the Map Algebra functionality.

Major topics covered

- Explore the different tools that can be used for managing rasters prior to analysis.
- Illustrate how to import Spatial Analyst and Map Algebra.
- Learn the different ways Map Algebra can be accessed:
    - Raster Calculator
    - Python window
    - Scripting.
- Show how to create simple and complex algebraic expressions using the base elements of Map Algebra:
    - Input rasters
    - Operators
    - Tools
    - Tool parameters
    - Output raster object.
- Provide an overview of the raster object, how to use it, and show some of its functionality:
    - Properties
    - How to make the raster object permanent.
- Examine how to optimize your Map Algebra expressions.
- Highlight how to use classes to gain more control over parameters within a model.
- Introduce you to how to convert a raster into a Python NumPy array, the analysis capability that can be applied to a NumPy array, and how to covert the results of that analysis back to Map Algebra. The NumPy capability that will be discussed includes:
    - Using existing functionality created by the scientific community that can be applied to NumPy arrays
    - Creating custom functionality on the array.
- Present the main differences between Map Algebra 10+ and pre-10 Map Algebra.
- Demonstrate through the creation of a complex model how to implement a sampling of the Map Algebra functionality.