Geospatial Scripting Afternoon

GTAC Geospatial Technology and Applications Center

Review

- The purpose of this training
  - To point you in the right direction and provide reference material

- What do I need to know to start scripting?
  - Syntax
  - Vocabulary

- Which language do I use and why?
  - Python – integrates well with ArcMap
  - JavaScript – gives access to Google Earth Engine
  - R – powerful statistical capabilities

Review

- So far we have covered:
  - Variables and Value Types
  - Operators
  - Conditional statements
  - Functions

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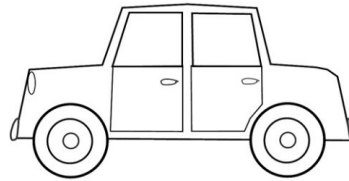 - Conditional statements
  - Functions

Afternoon

- Objects
- Methods

Objects

- A collection of data, defined by a **class**
- A class is like a template for an object
- An object has properties that describe the object

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- A class is like a template for an object
- An object has properties that describe the object
- Examples:

Class: Car
- Color
- Number of doors
- Engine size

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- A class is like a template for an object
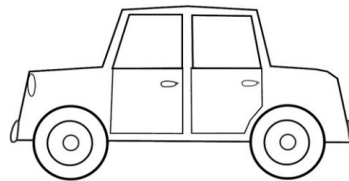- An object has properties that describe the object
- Examples:

Class: Car
- Color
- Number of doors
- Engine size

Instance of Class (object): My Car
- Red
- 4 door
- 4 cylinder

Objects

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- Examples:

Class: list
- Length
- Order
- Maximum value

Objects

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- Examples:

Class: list
- Length
- Order
- Maximum value

Object: myList = [2,5,9,17]
- Length = 4
- Order = Small to Large
- Maximum value = 17

Objects

- A collection of data, defined by a class
- A class is like a template for an object
- An object has properties that describe the object
- A class also has **methods**, which perform an action on the objects properties

Methods

- Methods perform an action on an object
- Each language has built-in methods for a specific class
- **Methods** have **arguments** that must be passed to it
  - Arguments are the items necessary for the method to work
- Format:
  - The method name is **called** and the arguments are **passed**
  - <method name><arguments>

Methods

Class: Car

Object: myCar

Method: drive(speed)

Format: <method name><arguments>

myCar.drive(35);

Methods

- Example: square root
  - Format: <method name><arguments>

$$x = 9$$

Language	Enter
Python	x = math.sqrt(x)
R	x <- sqrt(x)
JavaScript (Earth Engine)	var x = x.sqrt();

$$x = 3$$

Methods

- Example: sorting a list
  - Format: <method name><arguments>

years = […2015, 2016, 2017, 2018]

Language	Enter
Python	years = sorted(years, reverse = True)
JavaScript	years = ee.List(years).reverse();
R	years <- sort(years, decreasing = TRUE)

years = [2018, 2017, 2016, 2015…]

Questions?

Wrap Up

- Variables and Variable types
- Statements
- Operators
- Conditional Statements
- Objects
- Methods
- Functions

Wrap Up Discussion

- ## The purpose of this training
  - ### To point you in the right direction
    - What language is appropriate for your needs?
    - Other GTAC trainings to learn more advanced geospatial programming techniques in a specific scripting environment
  - ### Provide reference material
    - Exercises and glossary
- ## What was helpful?
- ## What needed further clarification?

Moving Forward

- This information will need to be revisited **many** times. The glossary will provide an extended reference

- Keep trying!

- Ask for help and keep practicing – Euler Project

Thanks!