**GISC 2335 – Programming for GIS**

**Week 11 – Chapter 8: Manipulating Spatial Data**

📅 **Class Date:** April 1, 2025  
🎓 **Instructor:** Mr. Erik Bushland  
🧠 **Focus:** Python scripting for manipulating spatial data in ArcGIS

**✅ Announcements**

* Midterm exams have been graded.
* Any ambiguous or misgraded questions were reviewed and updated.
* Please check your midterm score and feedback.

**🧾 CSV and Tabular Data**

* **CSV (Comma Separated Values)** is a widely used plain text format.
* Each value is separated by a comma (e.g., ID,1,3,3) which allows automatic conversion into columns/rows in software like Excel or ArcGIS.
* Excel may ask how the data is delimited (comma, tab, etc.).
* Some older programs use **tab-delimited** formats.

**🔁 Python and ArcPy Data Access (DA) Module**

* arcpy.da provides tools to manipulate spatial and tabular data.
* **Cursors** are used to insert, update, or search data:
  + SearchCursor: reads existing records.
  + InsertCursor: adds new records.
  + UpdateCursor: modifies existing records.
* **For-loops** are commonly used for iterating over rows.

**🧮 Using SQL in Python**

* SQL expressions can be used inside Python scripts with cursors.
* The where\_clause parameter in SearchCursor allows filtering of data using SQL syntax.

**✅ Data Validation and Parsing**

* Use ValidateTableName() and ValidateFieldName() to ensure compatibility with the workspace and avoid errors.
* Field/table names can be **parsed** into components using ArcPy functions.

**🧠 Field Calculator & Expressions**

* Python is often used in **Calculate Field** tools:
  + Basic expressions are written in Python (e.g., field = value \* 2)
  + These are often used behind the scenes in GUI-based tools.
  + Even though it doesn’t look like traditional programming (no import or if), it *is* Python.
* Esri’s Arcade language can be selected too, but internally, it likely converts back to Python.

**🛠️ Behind the Scenes**

* ArcGIS GUI actions (clicking, dragging, etc.) are backed by programming logic.
* All inputs, tools, and interfaces are programmed—often in Python or other languages.
* You don’t always see the full code, but Python handles many background tasks in geoprocessing tools.

**📚 Next Week Preview**

* **Chapter 9: Working With Geometries**
* Confirmed that the reading link goes to the updated 2024 version of the chapter.

**📅 Reminders**

* A campus event will be held **tomorrow at noon** in Room **J124B**.
* **Next Monday and Tuesday**: "Waffle stuff" event—no further details given.
* **Thursday’s class (next week)** will be **online only**. No recording is planned, but Mr. Bushland will be available live to answer questions.

**📬 Contact Info**

* Reach out any time via **email** or **Microsoft Teams** if you need help.