**Student Name:** _____ **Weight:** **7.5%**

**Student ID:** _____ **Marks:** **24**

# Assignment 1: Geoprocessing Fundamentals

## Purpose

The purpose of this assignment is to incorporate geoprocessing techniques into high-level programming (HLP) language.

This assignment is an individual effort.

## Introduction

You've been asked to create a report on cycling networks (ruseau cyclable) for Toulouse, France, to support the city's sustainable development plan. Your goal is to write a script that will identify the top 3 townships (communes) in the city that contain the most amount of cycling networks.

The data has been provided to you in shapefile format with 3 different cycling networks as well as a pre-built empty geodatabase. The Python script must be able to be run from the following location: **"C:\GEOS456\Assign01"**

## Instructions

1. Create a list of the RAW data (shapefiles) provided in the assignment data folder
2. Import/export the shapefiles to the geodatabase provided (Toulouse.gdb) and project the feature classes to the following coordinate system:
    - NTF (Paris) Sud France
    - It is assumed that the default geographic transformation is acceptable for this assignment
2. Once the features are stored in the geodatabase, generate another list of the features stored in the gdb
3. Use geoprocessing to intersect each cycling network to the Toulouse townships
4. Summarize the total length (km) of each cycle network within each township
5. The analysis should be able to answer the following questions for each cycle network:
    - What 3 townships contain the longest length of cycle network

- What is the total length in km of each of the top 3 townships?

6. The above process is to be completed using only one script
7. Finally, create a map layout with 3 map frames (one for each cycle network) that symbolizes the summarized length within each township as well as a table that outlines the 3 townships that contain the longest cycle network. Make sure to add all required cartographic elements to your map layout! An example of ***one*** map frame has been provided in the assignment data download as a PDF. Note that this map will be generated manually and not using Python.
8. Export your map layout as a PDF

**Note 1:** Check your script prior to submitting. If your script produces errors and requires debugging, and/or if the workspace directory is incorrect, and/or more than one submission loaded to D2L, ***5 marks*** will be deducted from the total of your assignment.

**Note 2:** Exporting a successfully run tool from ArcGIS Pro as a Python script will not be accepted as a submission. It is encouraged that you explore the tools in Pro prior to starting in Python, but your script must be your own original work. The use of ChatGPT/Copilot may be used as reference, but they cannot be used to produce the script for you. Academic dishonesty policies will be enforced if this is the case.

## Assignment Deliverables

Submit the deliverables outlined below in a zipped folder to Brightspace. Use the following naming convention:

**GEOS456_Assign<Assignment #>_<Last Name>.zip**
**Ex: GEOS456_Assign01_JohnstonStewart.zip**

### Content

Submit the assignment to your instructor in digital format. The required components for document submission are:

1. One Python script
   i. Author, date and script purpose must be included at the top of the script
2. Comments in the script
3. PDF map
4. Any applicable references as comments in the script

***Do not submit any assignment data or ArcGIS Pro projects***

### Due Date

Refer to the course schedule. Late assignments will not be graded.

**Note:**

- It is expected that all assignment reports will be grammatically correct.
- Although it is understood that you will collaborate with each other to achieve objectives, assignment submissions must be unique in content and approach. If this is not the case, then the Academic Dishonesty policies will be enforced.
- Proper citation of referenced material must be provided. If this is not the case, the Academic Dishonesty policies will be enforced.