Assignment 5 - GGS366 Spatial Computing

Due March 24th 2024

Please find the assignment questions enclosed, totaling 100 available points.

Remember, if you just rely on genAI, you will not learn the fundamental basics, and thus fail the graded closed-book test/exam planned for later in the semester. So, the important thing here is to really make a good attempt at solving these problems without any assistive tools, based on the materials you have learnt in the first few weeks of the class.

To submit the work, you need to write your answers in a colab .ipynb notebook and then:

1. Print the .ipynb notebook to a .pdf and submit for review on blackboard.
2. Submit also the actual .ipynb notebook on blackboard allowing your code to be easily run.

Without submitting both of these files like this, you will receive a 20-point penalty to your overall grade. Submitted work may be checked for plagiarism, including for GenAI usage. The Mason honor code applies.

The tasks you must complete are below:

1. Write out descriptions for what an object class is, as well as object properties and object methods (15 points).
2. Write code to create separate classes for a point, line and polygon object. Make sure each object has attributes such as ID, coordinates, and length/area for lines/polygons. The line must have a method which measures its length (either manually, or using Shapely). The polygon must have a method which measures its area (either manually, or using Shapely). Instantiate your objects, and write code to demonstrate their functionality (e.g., measuring length or area) (45 points).
3. Explain to a child, using metaphor, some of the key theoretical concepts of Object Oriented Programming, including encapsulation, inheritance, polymorphism, and abstraction. Good answers will include code descriptions, not just natural language (40 points).