

Assignment 4 - GGS366 Spatial Computing

Due March 17th 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) For the capital of Togo (Lomé), write code to estimate the geographic land area within the GID 2 region utilizing GADM boundaries. Look for the Lomé region polygon, which may be either “TGO.3.1_1” or “TGO.3.6_2” depending on your GADM data version. Make sure you use a projected Coordinate Reference System. Report your estimate to the closest square kilometer (20 points).
- 2) Estimate the geographic area taken up by buildings within the same Lomé region, using OpenStreetMap data. You will need to undertake an intersection, followed by finding the area on your remaining GeoPandas polygons. Think critically about this process, especially about the size of the data you are processing. If needed, there is a subset of building data on the MyMason course content page (40 points).
- 3) Estimate the length of railroad within the Lomé region, using OpenStreetMap data. You will need to undertake an intersection, followed by finding the length of your remaining GeoPandas LineStrings (40 points).