**Programming task list:**

Write some python code that does the following:

1. Import the spreadsheet giving location of the 9 points in Python (gps\_locations.csv)
2. Plot the 9 points in a map using Python, export as a .jpg or .pdf.
3. Using Python, draw a 100 meter-radius buffer circle around each of the 9 points. Plot these buffer circles, export as a .jpg or .pdf.
4. Read in the raster data entitled “NLCD\_2016\_Impervious\_L48\_20190405\_aeCiajHeNAvXB2754sYm.tiff”, located in the “imperviousness\_raster\_data” folder
5. Calculate the average imperviousness level for each of the nine 100 meter-radius buffer circles. Output a spreadsheet similar to gps\_locations.xlsx that also includes a new column which is the average imperviousness level for each of the buffer circles.

Here are some Python libraries / commands that may be helpful:

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| import rasterio |
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| import geopandas as gpd |
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| import pandas as pd |
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| from rasterstats import zonal\_stats, point\_query |
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| from shapely.geometry import Point |
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| import numpy as np |
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| import matplotlib.pyplot as plt |
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We recommend that you use Python 3.