 Hand -- in

* Please collect your answers for each task in a separate .py file and zipped them as **lab8\_yourname.zip**
* Submit the zipped file to the assignment dropbox called “**lab8**”.
* Include appropriate comments to explain what each line or block of code accomplishes. **You must comment your code for full credit**.

 Getting Started

Lab 7 provided experience using GDAL with Python. Now we turn to the OGR library, which exposes methods for vector (feature) processing. Once again you should carefully review the lecture notes and examples---the tasks below build heavily on them.

We've learned from **Example #5**in Module 4 Lesson 1-2 which shows how read Shapefiles using OGR, and how to access feature geometries and attributes. In this exercise you will read two Shapefiles: one is a polygon layer containing land parcels in the city of Santa Monica, California, and another is a linestring layer containing the path of a hypothetical proposed power line (created for this exercise). Both files are in the same coordinate system having ground units of feet.

[Parcels.zip](https://eipd.dcs.wisc.edu/for-credit/GEOG/FA17/geog378_labs_fa17/Parcels.zip) [PowerLine.zip](https://eipd.dcs.wisc.edu/for-credit/GEOG/FA17/geog378_labs_fa17/PowerLine.zip)

 Tasks

Task 1: (5 pts.)

Using OGR, write a Python script to read PowerLine.shp and calculate the length of the power line in miles and print out that value. Prove that your calculation gives the same answer as the geometry length() method. [*[Hint: if your program works properly, the answer will be 2.17 miles. Use d=((x1 - x2) \*\* 2 + (y1 - y2) \*\* 2) \*\* 0.5 to manually calculate the distance between 2 points]*]

Task 2: (5 pts.)

Extend the program in task 2 so that it also opens **Parcels.shp**. Print out the attribute names and attribute data types of the layer. (Note that this question does not ask for attribute values of any parcel.)

Task 3: (5 pts.)

Extend the program in Task 2 to print out the owner’s address ("SITUSADDR") and the area of every parcel crossed by the power line.

Task 4: (5 pts.)

More than a few people believe electromagnetic fields generated by power lines are a health hazard and don’t want to live within 250 feet of a power line. Write a Python program to construct a shapefile consisting of every parcel entirely within a 250 foot buffer of the proposed power line. Open your newly created file and the power line shape file in ArcGIS or QGIS. Create a 250 foot buffer of the power line using the GIS program. Display all three layers and make a screen shot or print the map to a pdf file. Turn in the image or pdf file and your Python program.