Programming for Geospatial Science & Technology

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GISC 3200K

Abstract

The idea is to create a method that you can calculate area for any polygon using Python script. The code should not be constricted by only co_bounds. You should be able to import any polygon and calculate the area

Background

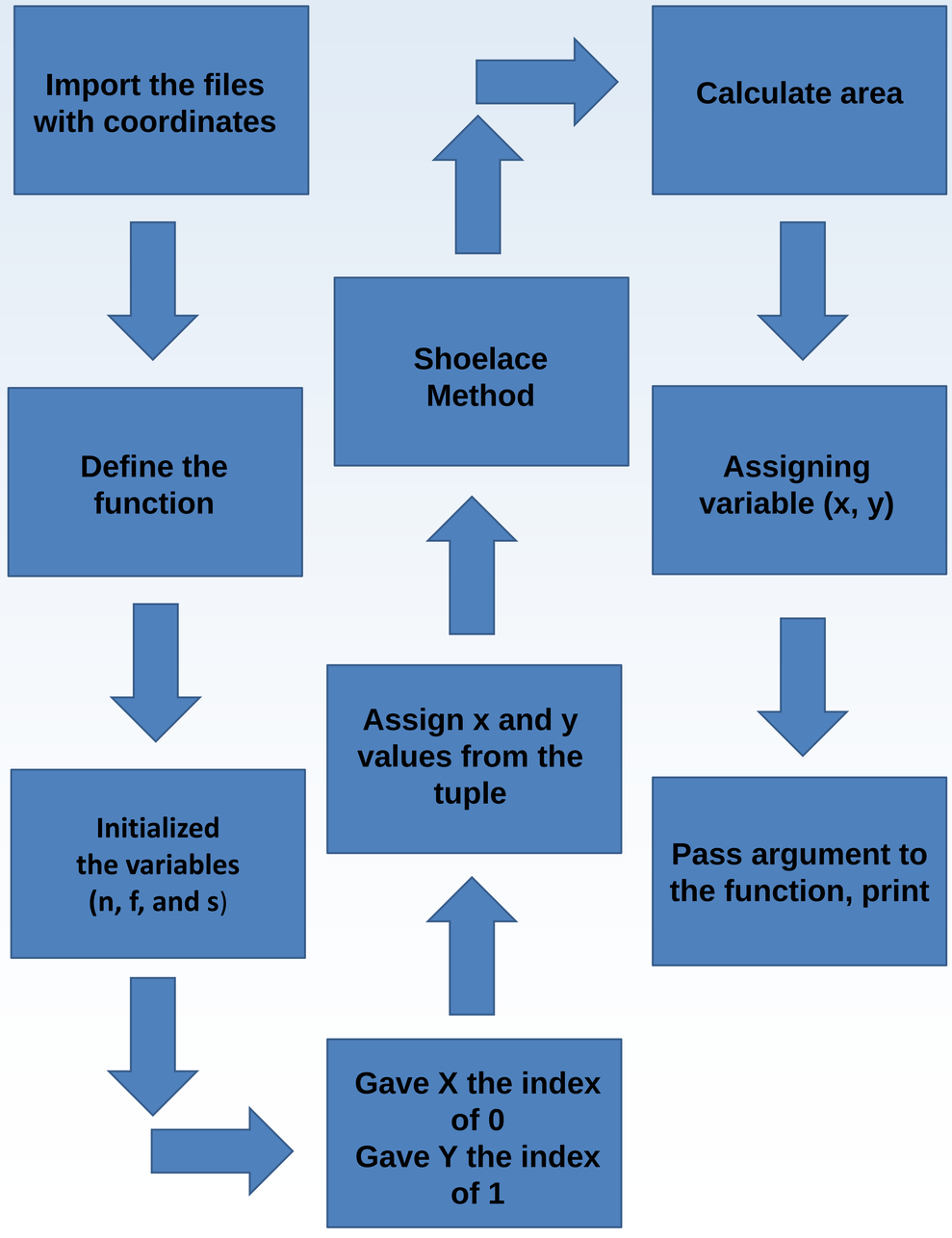
Python is a scripting language incorporated into many GIS software applications such as ArcGIS to automate geoprocessing tasks.

Tuple is a sequence of absolute Python objects. Tuples are sequences, just like lists. The differences between tuples and lists are, the tuples cannot be changed unlike lists.

Float is used to return a floating point number from a number or a string. The method only accepts one parameter and that is also optional to use.

Shoelace Method is a mathematical algorithm to determine the area of a simple polygon by cross-multiplying corresponding coordinates of the different vertices

Methods



Objectives

The objective is to create a method that you can calculate area for any polygon using Python script.

Results

The result you get is the square meters within each county. You can type the name of the county run it again and get the specific area of the one you picked. I went back and checked my answers with the googles answers.

Conclusion

In conclusion, I would like to take more times refining the code. I ran into some trouble with it running all of the counties area. It needs to be adjusted to be able to pick specific polygons for calculations.

References

Dr. Huidae Cho
Zac Miller
IESA
Dr. Panda
https://www.101computing.net/the-shoelace-algorithm/

Import the files with coordinates

```
from co_bounds import co_bounds
```

Define the function

```
def calc_area(boundary):
```

Initialized the variables (n, f, and s)

```
    n = len(boundary)
    f = 0
    s = 0
```

Gave X the index of 0 Gave Y the index of 1

```
    for i in range(0, n):        #Wi
        xl = float(boundary[i][0])
        yl = float(boundary[i][1])
```

Assign x and y values from the tuple

Shoelace Method

```
        f = f + (xl * yl)
        s = s + (yl * x2)
```

```
    if i<n-1:                    #If it wit
        x2 = float(boundary[i + 1][0])
        y2 = float(boundary[i + 1][1])
    if i==n-1:                   #If it out
                                 #Calculate
        x2 = float(boundary[0][0])
        y2 = float(boundary[0][1])
```

Calculate area

```
    area = abs(f - s)/2
    return area
```

Assigning variable (x, y)

```
x = co_bounds.keys()
y = list(x)
```

Pass argument to the function, print

```
n = len(co_bounds)

for u in range(0, n):
    boundary = co_bounds[y[u]]#It
    r_area = calc_area(boundary)#R
    print(r_area, "square meters")
```

```python
from co_bounds import co_bounds #Importing the coordinates

def calc_area(boundary):

    n = len(boundary)           #Initializing your variables
    f = 0
    s = 0

    for i in range(0, n):       #Within the len(boundary) I give 'x' 0 index and 'y' 1 index
        x1 = float(boundary[i][0])
        y1 = float(boundary[i][1])
        if i<n-1:               #If it within the boundary calculate the parimeter: i<n-1
            x2 = float(boundary[i + 1][0])
            y2 = float(boundary[i + 1][1])
        if i==n-1:              #If it outside that boundary calculate the parimeter: i==n-1
                                #Calculate the area until you get to here and once you get to here calculate it but use a different method
            x2 = float(boundary[0][0])
            y2 = float(boundary[0][1])
        f = f + (x1 * y1)       #Shoelace method
        s = s + (y1 * x2)

    area = abs(f - s)/2
    return area
                                #Calculate the area and print
x = co_bounds.keys()
y = list(x)                     #List of county names

n = len(co_bounds)

for u in range(0, n):
    boundary = co_bounds[y[u]]#It basically runs through the list until it finds x, y coordinates, once it finds them, it runs it through the range
    r_area = calc_area(boundary)#R_area = output of the 1st function
    print(r_area, "square meters")
```