

GIS400/500 GIS Programming (SFASU)**Lab 2 Python Basics (1)**

Due: 11:00 am, Thursday, 2.7.2019

Goal:

Through this lab, students are expected to learn how to write a short script (.py file) and to use string and numbers in Python.

Data

Y:\UnderGraduate\GIS400_500 \lab2, copy the folder to your drive (Z or flash drive), do not work directly on Y drive.

Instruction**1. Basic string and number operations in Python**

- a. Start the Python Shell window by Start – All Programs - ArcGIS – Python 2.7 – IDLE (Python GUI). In between steps for this part click Restart Shell from the Shell menu. This prints out a break line and will provide a little more clarity for you.
- b. Demonstrate the use of *all* of these basic mathematical operators (+, -, *, /, %, **) using literals in the Python Shell window. For example when you type 2 + 3 and click enter it will print 5. Use any numbers you choose (different than below). After completing this step, take a screenshot of the Python Shell window and paste in hand-in document. An example of a screenshot is shown below.

Screenshot: in Microsoft Word, go to the Insert ribbon, Illustrations – Screenshot – screen clipping to pick up the area you'd like to insert into the Word file.

```
>>> 11 + 5
16
>>> 11 - 3
8
>>> 12 * 3
36
>>> 15 / 5
3
>>> 16 % 5
1
>>> 12 ** 2
144
>>> |
```

- c. Repeat the exercise above but use variables to represent the numbers before you do the math operations. See screenshot below for one example operation. Be sure to do one for each operator (+, -, *, /, %, **) After completing the step, take a screenshot of the Python Shell window and paste in hand-in document.

```
>>> ===== RESTART =====
>>> x = 6
>>> y = 2
>>> x / y
3
```

- d. Create two variables to hold your first name and last name. Then concatenate them and display them. Convert it to upper case and lower case with corresponding string functions. After completing the step, take a screenshot of the Python Shell window and paste in hand-in document.

```
>>> ===== RESTART =====
>>> lastName = "Zhang"
>>> firstName = "Yanli"
>>> myName = firstName + " " + lastName
>>> myName
'Yanli Zhang'
```

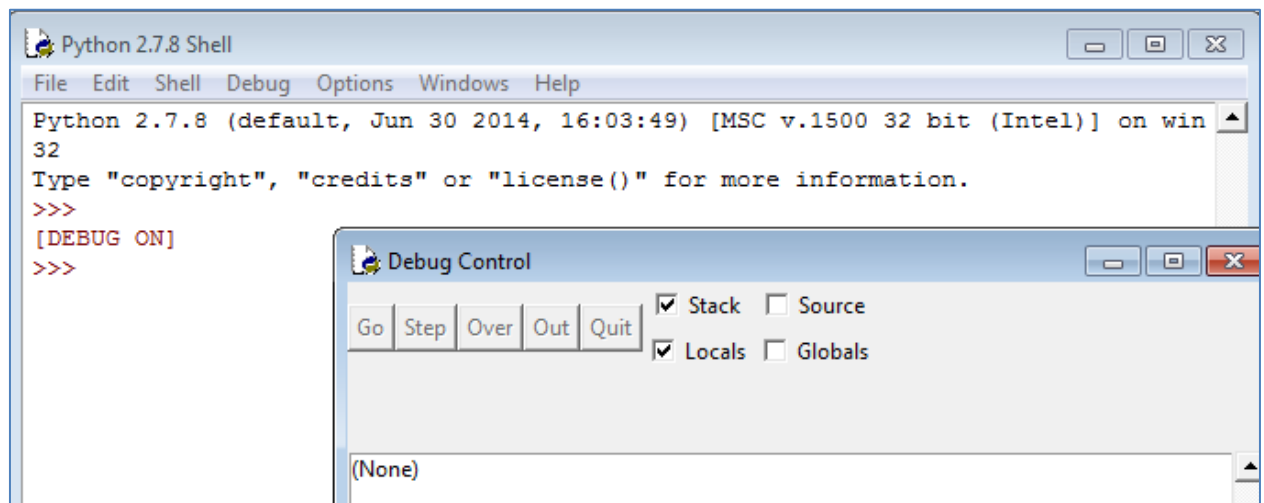
2. Create a Python script (.py) file with IDLE

In this exercise we will create our first Python script file. It will not be a real functional one but will be used to reinforce some of the number and string concepts and also show how you can send output to the Python Shell window which is often useful when testing a script. There will be several distinct and independent steps that will make up the final script.

In your script you should add comments literally to explain in plain English what script steps are doing. If no comments are included there will be some reduction in points. Save the script frequently. You can also try to run the script as you go along to see if the code is correct.

- a. Start the Python Shell window by Start – All Programs - ArcGIS – Python 2.7 – IDLE (Python GUI).
- b. In the Python Shell window click File – New Window.

(The Python Shell window and the new window are different with different menus)



- c. In the new window that will say 'Untitled' click File – Save. Navigate to your working directory or personal drive and save the file as yourName_Lab2.py. Make sure the type is "Python and text files" and also type the .py in the dialog.
- d. Add the script header information as comments (which start with #). The header information, as introduced in the lecture, should include: your name, the date, description of the purpose of the script (you can add this part after completing the steps below), other info, break line (#-----). See screenshot below for reference. Remember you will be graded on having comments in your code.

```

#Name: Yanli Zhang

#Date: 1.10.2016

#purpose: This script is a basic demonstration of string and numbers in Python.

#-----

#These lines are simply to demonstrate printing to the Python Shell window and to
#demonstrate converting an integer to a string.
print("Hello World")
print(2016)
print("Hello world " + str(2016))

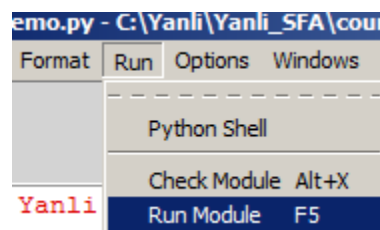
#break line to separate results in Python Shell window for clarity
print("-----")

#use variables for a few strings and numbers to compose a sentence which you print to
#the Python Shell window. Use the str() conversion to convert numbers to string
firstString = "SFASU stands for "
firstName = 'Stephen '
middleName = 'F. '
lastName = 'Austin '
DateEstablished = 1923

finalPrint = firstString + firstName + middleName + lastName + " State Univesity and was \
established in " + str(DateEstablished) + "."
print(finalPrint)

```

- e. Make up your own variables and sentences (an example could be saying what year you were born, how many credit hours you are taking, when you will graduate, etc.). The only requirement is that each of the two sentences must use variables that hold number and string objects with the str() function used to convert the numbers to strings for concatenation. Separate the two sentences in the output by using a break line similar to what was shown above.
- f. When you finish, click Run – Run Module. Save your file if the pop up message requires.



- g. You will see the output if there is no error. Following is the output from step d and servers as a reference.

```
>>>
Hello World
2016
Hello world 2016
-----
SFASU stands for Stephen F. Austin State Univesity and was established in 1923.
```

- h. There is a Python script named as StringMethods.py in lab 2 folder. Open it from the Python Shell window.
- i. Please read all of the code in this script and try to understand what the code is supposed to do. The purpose is to demonstrate the use of several methods on string objects. Try to understand the syntax of each individual method by reading the comments. Run the StringMethods.py script and see the output it produces.
- j. In this part of the assignment you must write code in your script (yourname_Lab2.py) to demonstrate the use of at least 4 (you choose which 4) of the string methods (upper/lower, capitalize, islower, find, replace, rstrip, lstrip, and len) demonstrated in StringMethods.py. You must use your own unique strings that are different than those you see in the examples in StringMethods.py (and different from other students). Write comments to explain your code.
- k. Run the script when all done (Run – Run Module). Take a screenshot of the Python Shell window which should show the output that is produced from your script. If there are errors, please fix them and re-run the module. Paste the screenshot of successful execution into your hand-in document. You may need to resize the Python Shell window to show all output.
- l. Turn in a copy of your module script in addition to the hand-in document. To print, from the script window choose File – Print Window and click OK in dialog that says ‘Print to Default Printer’.