CMPS 150 – Lab 9 – March 22, 2017

The following is an exercise in working with Python functions. When done, be sure your Python source code runs properly and upload your completed lab to your TA on Moodle. This exercise will be available online on Moodle if you wish to use it again.

Log in to CMPS Lab

1. *Copy/Save the lab source code file for today from the Moodle Lecture Site*

Look for the files for today "lab9.py" AND "lab9.input" and save the files to your machine.

2. *At the Linux desktop, open a terminal window (i.e., command line window)*

Do this by right-clicking on the desktop and selecting "Open Terminal" from the menu.

3. *Launch IDLE.*

   idle3.5

> Or, on the MacMini, select "Go" from the menu bar, then "Applications"
> Find the Python 3.5 applications, double-click on it, and select "IDLE"

4. *Edit the first two lines of the code to have* **your** *name/clid/section.*

```
# Author:       Your-Name
# CLID/Section: Your-CLID & section-number go here
```

5. *Add functions to perform several tasks, returning all results to main to be printed.*
This lab will compute areas and volume of geometric objects. Data for dimensions will be in a data file. The file will contain an unknown amount of data, therefore you must use a sentinel-controlled while loop to process the data. Each "set" of data will consist of the following: a string on a line by itself (indicating the type of calculation to be performed), then numeric(s) on the following line that are needed to perform that type of calculation.

The types of calculations are:
- AC – area of a circle   radius
- AR – area of a rectangle or square   length, width
- VC – volume of a cylinder   radius, height
- VR – volume of a rectangular prism   length, width, height
- VS – volume of a sphere   radius
- SAC – surface area of a cube   length
- SAS – surface area of a sphere   radius

```
AC
7.5
SAC
4
VR
2
3
4.1
AR
13
3.25
SAS
24
###
0
```

Listed to the right of each type of calculation above is the number
of numeric items that must be read for this type of calculation.
You must write functions for each of these calculations.
You must read data in the main function and pass appropriate data
as parameters to functions.

NOTE: How many numerics are to be read is dependent on the type of calculation
to be done. Therefore, the reading of the numeric data must be done in an if stmt.

Since this is a sentinel-controlled loop, you must have a sentinel value to indicate when the loop must end. The sentinel value is when the string for type of calculation is "**###**". A sample file can be seen at right.

NOTE: You will read ONLY the type of calculation before the while loop and at the end of the while loop. Therefore, this is slightly different than other programs we've written where we automatically read ALL items for the set of data.

REMEMBER: Your program must run properly for ANY number of "sets" of data.

- Area Calculations
  - Square/Rectangle = length * width
  - Circle = PI * radius * radius
- Volume Calculations
  - Cube/Rectangular Prism = length * width * height
  - Cylinder = PI * radius * radius * height
  - Sphere = 4/3 * PI * radius * radius * radius
- Surface Area Calculations
  - Cube = 6 * length * length
  - Sphere = 4 * PI * radius * radius

6. *When you have edited and reviewed the code, save the file, and run your code.*

7. *Debug your code (perhaps you can skip this step).*

If you have any errors in your code, the interpreter will produce an error, with a line number, where it detects there is a problem with your code. Return to the editor and correct the error. Run it through the interpreter again (step 6) until it runs with no errors.

8. *Sample Run*

```
Area of a Circle                   176.71
Surface Area of a Cube              96.00
Volume of a Rectangular Prism       24.60
Area of a Rectangle/Square          42.25
Surface Area of a Sphere          7238.23
```

9. *Exit Python*
Close the Python IDLE editor by clicking the X in the upper right corner (or selecting File/Exit from the menus).
Close the Python IDLE shell by clicking the X in the upper right corner (or typing Ctrl-D).

10. *Exit Terminal*
Close the terminal window by clicking the X in the upper right corner (or typing Ctrl-D).

11. *Upload to Moodle*
Get in a browser (the globe icon on the toolbar at the top) and login to Moodle.
Instead of going to the Lecture Section, go to YOUR specific Upload section on the Moodle site.
Here you will see the lab for today. Click on the link for Lab #9.
Click to "Add a Submission" then "Upload a File"
Select to "Choose a File" and go about the process of browsing/finding "lab9.py" on the computer
Select to "Upload this File"

When returned to the Upload screen, MAKE SURE to click on the "Save Changes" button.

You will be returned to the "Lab #9" screen. This time you should see your source code file listed on it.

12. *Logout of Moodle*

13. *Logout of Linux*
Logout is found on the System (toolbar at the top) menu.