CS410P

LAB 1L

Description

This exercise gives you practice with simple input, output operations as well as arithmetic expressions using the numerical operators.

Problem

Write a program that prompts the user for three numbers, the side, radius and height needed to compute the area and volume of several shapes. The shapes for computing areas are: Square, Circle, Cube Surface, Sphere Surface, Cylinder Surface and Cone Surface. The shapes for computing volumes are: Cube, Sphere, Cylinder, and Cone. The formula for computing each one of these is shown below.

Areas:

Square	$side^2$
Circle	pi x $radius^2$
Cube Surface	6 x $side^2$
Sphere Surface	4 x pi x $radius^2$
Cylinder Lateral Surface	2 x pi x radius x height
Cone Lateral Surface	pi x radius x side

Volumes:

Cube	$Side^3$
Sphere	4/3 x pi x $radius^3$
Cylinder	pi x $radius^2$ x height
Cone	1 /3 x pi x $radius^2$ x height

Solving it Step by Step

Here's a recommended way to proceed:

1. Create a directory called 1L under the appropriate folder on your computer as indicated in your previous lab.
2. You will need to download a starter file for this lab. Click on the "Public Folder" link on the course web site. Now you can navigate to the 1L folder that you see there and download the file that you see there.
3. Open the file using Spyder and run it to see what it does.
4. Currently the program prompts for just one input, the side. It also computes only one formula i.e. to compute the area of a square. First extend it to include taking the 2 other inputs and print the 2 values input by the user.
5. To obtain input from the user we use the input function. Note that to convert the user input (which is always a string of characters by default) to an integer we use an int() function
6. Save and run the program and make sure you can correctly display all 3 values input by the user.
7. Continue to extend the program by writing the appropriate statements to compute and print all other areas and volumes.
    a. Note all the formulas that are supplied to you in the comments on top. This is also an example of how you can put your down comments of your own to indicate what the program is doing
    b. Start out by computing just one value at a time and verify the results before proceeding to do the rest.

c. If you want to use a value for the mathematical constant "Pi" you must import the math library first – use the "import math" statement before you begin writing any other code after which you can use "math.pi" to generate the value of "Pi" from the Python Math library. Try it out!
d. Note the alternate way to compute and print the area of a square, it's commented out but you can see that both computing and printing can be achieved on the same line if desired.
e. Your output should resemble mine (doesn't have to be exactly the same, but very similar). For this program you do not need to worry about formatting the results in any manner (i.e. it's ok for the program to print several digits after the decimal)
f. Be sure to add your name at the top of the program as a comment

8. Testing your program is as important as writing the program itself. If the program produces incorrect results it could be as bad as not writing one at all. Test your program with different user inputs.
9. To assist you with testing your program you can compare your program output with mine located under the same 1L folder on the web site: - I have created a few files named out1, out2, etc. for showing you the program output for different inputs. Use the same inputs as mine and verify that your program output matches with mine.
10. If you are satisfied that your program works correctly submit your program for grading via myCourses for 1L

Grade Key

A	Name, comments	**5**
B	Proper inputs and prompts	**7**
C	Correctly computes each area or volume (7 points each)	**63**
D	Output in reasonable format	**10**
E	Works correctly for multiple input combinations	**15**