

Lab 2 – CSE 101 (Spring 2020)

This lab will cover using functions and also show off some additional features in PyCharm and some examples of how you can study on your own for this course. At the end, you will submit four Python programs that you made.

1. Use your IDE (PyCharm) to create a new file named `calculatearea.py`. Type in the following lines, exactly as they are shown here (including the four spaces before the word `return`) and save the file:

```
def calculateArea(width, height):
    return width * height

# Take input from the user
width = float(input('Enter width in inches: '))
height = float(input('Enter height in inches: '))

# Call the function and store the calculated area
area = calculateArea(width, height)

print('The total area in inches is: ', area)

# Now print the area with 2 decimal precision.
print('The total area in inches is: ', '{:.2f}'.format(area))
```

Now try running the file in your IDE. Test it out with various inputs, such as a number with several decimal places (e.g. 17.453566), or using negative numbers.

Trying out your program with different inputs can be helpful to understand what it is doing and areas where it may not be working. If this was a proper program to calculate area, we would want to handle negative numbers as input, which we will cover in the future.

2. Use your IDE (PyCharm) to create a new file named `countertop.py`. Type in the following lines, exactly as they are shown here (including the four spaces before the indented lines of code) and save the file:

```
def countertop(sideLength):
    """
    Compute the area of a square countertop with a missing wedge. The parameter x is
    the length of one side of the square.
    """
    square = sideLength ** 2 # area of the full square
    triangle = ((sideLength / 2) ** 2) / 2 # area of the missing wedge
    return square - triangle
```

Now we want to use the `countertop` function to calculate the area given the user's input and print out the result. Take input from the user like we did in problem 1. Then call the `countertop` function and store the result in a variable, before printing that variable on the next line. Try running the program in the IDE.

3. Go to page 35 in the textbook “Explorations in Computing”. Follow the tasks T31 – T35 from the tutorial project.

Note that in PyCharm you can run a file in the Python Console by right-clicking on the code and then choose “Run File in Python Console”.

Also note that for step T34, the book gives a definition and example on the previous page of what a “docstring” is.

4. Create a new file named `spherevolume.py` that does the following: Define a function named `sphereVolume` that accepts a radius value as an argument and returns (not prints) the volume of a sphere with that radius.

Write code to test your function with the following inputs:

```
sphereVolume(2.0) // should return 33.510321638291124 or a number close to it.  
sphereVolume(5.0) // should return 523.5987755982989 or a number close to it.
```

5. Download and open the lecture 3 slides (posted on the course website), and go to slide 8 titled “Other functions in Python.” Now in PyCharm, open up the Python Console (Go to the “Tools” Menu” and choose “Python Console”) and try typing in each of these lines and see what happens. Remember that you will need to type the import statements, such as “import math” before you can use the functions below them in their columns.

Some of the values it returns may not fully make sense at first (such as when you type “math”) but experiment and try to understand what is going on. This is a way you can learn more and gain experience programming on your own, which will also help you on the assignments and tests in this class.

6. Submit **`calculatearea.py`**, **`countertop.py`**, **`celsius.py`**, and **`spherevolume.py`** programs on Blackboard.