

Honors Computer Science Python

Mr. Clausen

Program 2A, 2B

Program 2A Sphere Here(20 points)

Write a program to calculate the diameter, circumference, surfaceArea, and volume of a sphere after asking the user for the radius. To see a model for this program look at the source code for the program “taxform.py” in the network directory titled: “HnrCSPythonFiles”. Look in the folder “Student Data Files” and “Ch_02_Student_Files”.

- 1) Use a `DocString` at the beginning of the program for your comments. Type comments at the beginning of the program to display your name and other information just like those used for program 1A. **Be sure to change the program name, program number, and program description.**
- 2) Leave a blank line after the `DocString`.
- 3) Type: **import math** (to import all of the math functions in the math module).
- 4) Leave a blank line after the import statement
- 5) Initialize all of the variables that are to be used in this program. Initialize each variable on a separate line. (Initialize integers to 0 (zero) and decimal numbers (floats) to 0.0. Make sure that you use descriptive identifiers for all of your variables to model “self-documenting code”.
- 6) Leave a blank line after the variable initialization statements.
- 7) Type the following comment:
#-----Display My Information-----
Follow this comment with print statements to display your name and period output just like those used for program 1A. **Be sure to change the program name, and program number.**
- 8) Leave a blank line after the print statements listed above.
- 9) For the Input section, type the following comment:
#-----Input-----
Ask the user for the radius. Be sure to type cast this input to “float” before you assign it to the variable.
- 10) Leave a blank line after the input section.
- 11) For the Calculations section, type the following comment:
#-----Calculations-----
Perform all of the calculations.

The formulas are:

diameter = 2 * radius

circumference = diameter * pi

surface area = 4 * pi * radius * radius

volume = 4/3 * pi * radius * radius * radius

Use the exponent calculation instead of multiplying the radius by itself.

Use the value of pi contained in the math module you imported instead of pi.

12) Leave a blank line after the calculation section.

13) For the Output section, type the following comment:

```
#----- Output-----
```

Echo out the value of the radius as well as the results of your calculations for the diameter, circumference, surfaceArea and volume of the sphere. The output should look something like the following:

```
The radius is: 2.0
The diameter is: 4.0
The circumference is: 12.566370614359172
The surface area is: 50.26548245743669 square units
The volume is: 33.510321638291124 cubic units
```

14) Finish your program with these last 2 lines of code.

```
print ("")
input("Press enter to quit the program")
```

15) Save your program as LastNameFirstNameP2A.py.

16) When you are finished with your program, have tested it thoroughly to make sure that your program is correct, and are sure that you don't need to make any changes, then save your program in the "T" network mapping, in the Program 2A folder.

Program 2B Momentum and Kinetic Energy (Page 74 #5-6) (20 points)

The description for this program is found in our textbook on page 74 Projects 5 – 6. Use good programming style as described for program 2A.

- 1) Use a DocString at the beginning of the program for your comments. Type comments at the beginning of the program to display your name and other information just like those used for program 1A. **Be sure to change the program name, program number, and program description.**
- 2) Leave a blank line after the DocString.

- 3) Initialize all of the variables that are to be used in this program. Initialize each variable on a separate line. (Initialize integers to 0 (zero) and decimal numbers (floats) to 0.0. Make sure that you use descriptive identifiers for all of your variables to model “self-documenting code”).
- 4) Leave a blank line after the variable initialization statements.
- 5) Type the following comment:
#-----Display My Information-----
Follow this comment with print statements to display your name and period output just like those used for program 1A. **Be sure to change the program name, and program number.**
- 6) Leave a blank line after the print statements listed above.
- 7) For the Input section, type the following comment:
#-----Input-----
Ask the user for the mass and velocity. Be sure to type cast these inputs to “float” before you assign them to the variables.
- 8) Leave a blank line after the input section.
- 9) For the Calculations section, type the following comment:
#-----Calculations-----
Perform all of the calculations.
The formulas are listed in the textbook on page 74.
- 10) Leave a blank line after the calculation section.
- 11) For the Output section, type the following comment:
#----- Output-----
Echo out the value of the mass and velocity as well as the results of your calculations for the momentum and kinetic energy. The output should look something like the following:

```
The mass is: 2.0 kilometers  
The velocity is: 3.0 meters per second  
The momentum is: 6.0  
The kinetic energy is: 9.0
```
- 12) Finish your program with these last 2 lines of code.

```
print ("")  
input("Press enter to quit the program")
```
- 13) Save your program as LastNameFirstNameP2B.py.
- 14) When you are finished with your program, have tested it thoroughly to make sure that your program is correct, and are sure that you don't need to make any changes, then save your program in the “T” network mapping, in the Program 2B folder.