Project 1

Due January 16, 2015 at 11:55 PM

You will be working alone for this project. You should avoid using existing source code as a primer that is currently available on the Internet. You **must** specify in your comments of the file any sources of code that you have viewed to help you complete this project. All class projects will be submitted to MOSS to determine if students have excessively collaborated. Excessive collaboration, or failure to list external code sources will result in the matter being transferred to Student Judicial Affairs.

1. You will be writing a Python program to calculate total restaurant bill, suggested tip amounts and change that should be returned. Name your file **restaurant.py**.
    a. Place a comment at the top of your file as follows:
    ```
    #
    # Name: Your Name
    # ID  : Your Student ID
    # Date: Today's Date
    #
    ```
    b. Prompt and subtotal entry. Your program will prompt the user to enter the restaurant subtotal bill. This will be entered as dollars and a separate entry for cents. Your prompts need to be as follows:
    ```
    Enter subtotal dollars>
    Enter subtotal cents  >
    ```
    c. Output the subtotal, tax (8%), and restaurant bill total. Your output needs to be as follows, where DD is the dollar amount, and CC is the cents.
    ```
    Subtotal: $DD.CC
    Tax     : $DD.CC
    Total   : $DD.CC
    ```
    d. Output the suggested tip amounts of 10%, 15%, and 20% of the **subtotal**. Your output needs to be as follows, where DD is the dollar amount, and CC is the cents.
    ```
    Tip 10%: $DD.CC
    Tip 15%: $DD.CC
    Tip 20%: $DD.CC
    ```
    e. Prompt and payment entry. Your program will prompt the user to enter the payment. This will be entered as dollars and a separate entry for cents. Your prompts need to be as follows:
    ```
    Enter payment dollars>
    Enter payment cents  >
    ```

f. Output the required change. This will calculate the number of each bill and coin type that needs to be returned. Your output needs to be as follows, where the X's are the number of bills/coins to be returned.

```
$100 Bill(s): X
 $50 Bill(s): X
 $20 Bill(s): X
 $10 Bill(s): X
  $5 Bill(s): X
  $1 Bill(s): X
  Quarter(s): X
     Dime(s): X
   Nickel(s): X
  Penny(ies): X
```

2. You will be writing a Python program to calculate the distance of a point from the origin in 3D space, and to calculate the volume and surface area of the sphere that has the point on its surface and is centered at the origin. Name your file **sphere.py**.
   a. Place a comment at the top of your file as follows:

```
#
# Name: Your Name
# ID  : Your Student ID
# Date: Today's Date
#
```

   b. Prompt and point entry. Your program will prompt the user to enter the point in space. This will be entered in as X, Y and Z separately. Your prompts need to be as follows:

```
Enter X>
Enter Y>
Enter Z>
```

   c. Output the distance from the origin. Your output needs to be as follows, where X, Y, Z are the coordinates and D is the distance. Your D should keep three decimal places.

```
Distance to (X, Y, Z): D
```

   d. Output the volume of the encompassing sphere. Your output needs to be as follows, where V is the volume. Your V should keep three decimal places.

```
Volume of sphere: V
```

   e. Output the surface area of the encompassing sphere. Your output needs to be as follows, where A is the area. Your A should keep three decimal places.

```
Area of sphere: A
```

Example restaurant.py run (bold is input):

```
Enter subtotal dollars> 45
Enter subtotal cents  > 22
Subtotal: $45.22
Tax     : $3.61
Total   : $48.83
Tip 10%: $4.52
Tip 15%: $6.78
Tip 20%: $9.04
Enter payment dollars> 100
Enter payment cents  > 0
$100 Bill(s): 0
 $50 Bill(s): 1
 $20 Bill(s): 0
 $10 Bill(s): 0
  $5 Bill(s): 0
  $1 Bill(s): 1
  Quarter(s): 0
     Dime(s): 1
   Nickel(s): 1
  Penny(ies): 2
```

Example sphere.py run (bold is input):

```
Enter X> 2
Enter Y> 3
Enter Z> 4
Distance to (2.0, 3.0, 4.0): 5.385
Volume of sphere: 654.162
Area of sphere: 364.425
```