

Lab 2

PART A – In-Class (Due End of Class), 5 marks

1. Create Python Project with the name Lab2
2. Create a Python file called retail_item.py

In file retail_item.py

Create a main function as follows:

```
def main():

    pass

if __name__ == "__main__":
    main()
```

3. Create the following functions:

- Function with the name get_retail_purchase(). This function takes in no parameters but prompts the user to enter the following information on a retail item purchase:
 - Description
 - Number of items purchased
 - Price per unit
 - Tax rate (for example if the tax rate is 6% the user should enter 0.06)

The function should convert the values above to the correct type, as necessary, and return them.

- Function with the name calculate_subtotal(). This function takes two parameters: the price, and quantity_sold. This function calculates and returns the subtotal amount. Subtotal is calculated by multiplying the price of the retail item times the quantity sold.
- Function calculate_tax(). This function takes two parameters: the subtotal and the tax, the function calculates and returns the tax amount of the given subtotal.
- Function calculate_total(). This function takes two parameters: subtotal and tax. the function calculates and returns the total amount

- Function `display_sales_receipt()`. This function takes in parameters for `description`, `num_items`, `unit_price`, `tax_rate`, `subtotal`, `tax` and `total`. It prints the receipt to the console (see format of the receipt below).
- In function `main()` remove the keyword `pass` and call functions to implement the following:

Get the retail item description, quantity sold, price and tax from the user. Calculate the subtotal, tax amount and the total. Finally display the sales receipt. The following is what the output from running the program should look like:

```

enter retail item description:Laptop
enter quantity purchased:2
enter price per unit:799.99
enter tax:0.12
Sales Receipt:
Item Description: Laptop
Number of Purchased items: 2
Unit Price: 799.99
Tax Rate: 0.12
Subtotal: 1599.98
Tax: 191.9976
Total: 1791.9776

```

- Make sure to include doc-string in every function
- **Demo to your instructor in class today that you get the correct output as above. Then submit your `retail_item.py` to the Lab 2 Dropbox on the Learning Hub (along with your Part B submission by the due date).**

Part B – Take Home (due before next lecture), 10 marks

1. Create two files in project Lab2 one with the name `utilities.py` and one with the name `main.py`

2. In file utilities.py implement the following:

- import module math from Python Standard Library
- Create the following functions:

- Function calculate_circle_area(), the function takes the radius as a parameter, calculates and returns the area() of the circle.

Hint: circle area is computed using the formula $area = \pi * r^2$

Use the statement math.pi to get the value of π

- Function calculate_sphere_volume(), the function takes one parameter which is the radius, calculates and returns the sphere volume.

Hint: the sphere volume is calculated using the formula

$$volume = \frac{4}{3}\pi r^3$$

- Function calculate_BMI()[body mass index], the function takes no parameters but prompts the user to enter the weight in kilograms and the height in meters, calculates and returns the body mass index.

Hint the BMI is calculated using the formula $BMI = \frac{weight}{height*height}$

- Function calculate_hypotenuse(), the function takes no parameters but prompts the user to enter the lengths of side A and side B of a right triangle. The function will calculate and return the length of a right triangles hypotenuse

Hint use function hypot() from module math

3. In the file main.py import module utilities

4. Create a main function and implement the following :

- Prompt the user to enter the radius of a circle, call function calculate_circle_area passing the radius provided by the user and display the result.
- Prompt the user to enter the radius of a sphere, call function calculate_sphere_volume() passing the radius provided by the user and display the result.
- Call function calculate_BMI() and display the result.
- Call function calculate_hypotenuse() and display the result.

Here is the expected output of main.py

```
enter the radius of a circle in cm:5
the area of circle is 78.53981633974483
enter the radius of a sphere in cm: 5
the volume of the sphere is: 523.5987755982989
enter the weight in kilograms:63.5
enter the height in meters:1.73
the Body Mass Index is 21.216879949213137
enter the length of side A in cm:3
enter the length of side B in cm:4
the hypotenuse length of the right triangle is: 5.0

Process finished with exit code 0
```

Best Practices

- Variable names are descriptive and should be lower_snake_case
- function names should be lower_snake_case
- All functions include Doc-String comments

Part B Submission

Submit a zipfile with your two files (main.py and utilities.py) to the Lab 2 Dropbox on the Learning Hub before next lecture. Please also include your Part A code (retail_item.py) in your submission as well.