CS 1301
Pair Homework 2 – Conversions/Complex Functions

Due: Monday, January 28ᵗʰ, before 11:55 PM
Out of 100 points
Files to submit: 1. hw2.py

You will be writing several functions, but they will all be saved in one file: hw2.py. Please save all of the functions in this one file or you will lose points. **This is a pair programming assignment!** You are expected to work with the person you have been pared with in class, and you are both responsible for submitting the exact same code to T-Square. Follow good pair-programming practices by working together at a single computer and switching the driver/navigator role frequently.

Your pair may collaborate with other students in this class. Collaboration means talking through problems, assisting with debugging, explaining a concept, etc. You should not exchange code or write code for other pairs. Collaboration at a reasonable level will not result in substantially similar code. For pair programming assignments, you and your partner should turn in identical assignments.

For Help:
- TA Helpdesk – Schedule posted on class website.
- Email TAs

Notes:
Don't forget to include the required comments and collaboration statement (as outlined on the course syllabus).
Do not wait until the last minute to do this assignment in case you run into problems.
If you find a significant error in the homework assignment, please let a TA know immediately.

Part 1 – Conversions (45 pts)

Function name: area (15 pts)

Write a function called **area()** which takes in two numerical values, height and width. This function will use the given parameters and find the area of a triangle. The area should be **printed** and not returned. The formula for area is: area = 1/2 * height * width

Sample Output:
```
>>> area(10,5)
25
>>> area(30,1)
15
```

Function name: areaOfCylinder (15 pts)

Write a function called **areaOfCylinder()** that takes in two parameters; radius and height. The formula for the surface area of a cylinder is: $SA = 2 * \pi * radius^2 + 2 * \pi * radius * height$. The first parameter will be radius and the second parameter will be height. Answer has to be rounded 3 decimal places. The function should print out "The area is " followed by the surface area. **HINT: Use the built in pi value from the math library**.

Sample Output:
```
>>> areaOfCylinder(5,10)
The area is 471.239
>>> areaOfCylinder(1,2)
The area is 18.850
```

Function name: seats (15 pts)

So, it's Friday and Rebecca Black needs to know how many seats there are for her to take. Since Rebecca does not know how to code, she needs your help. Write a function called **seats()** which takes in two parameters cars and schoolbus. Each car has 3 seats for her to take and each schoolbus has 15 seats. The formula for this function is: totalseats = cars * 3 + schoolbus*15. Make sure your order of operation is correct. Print the appropriate value with the message shown below.

Sample Output:
```
>>>seats(5,10)
Rebecca Black can take 165 seats.
>>>seats(0, 1)
Rebecca Black can take 15 seats.
```

Part 2 – Complex Functions(50pts)

Function Name: sandwichCalculator()

You are designing a function for the local Subway sandwich shop.

Parameters

Bread – An integer that will tell you how many breads there are
Tomatoes – An integer that will tell you how many tomatoes there are
Bacon – An integer that will tell you how many strips of bacon there are

Functionality: This function will calculate how many sandwiches can be made with the ingredients given and return the **PRICE** of the total order. Each BLT(yes, this subway has run out of lettuce) contains 2 bread, 3 tomatoes and 2 strips of bacon and costs $6. When one ingredient runs out, you cannot make any more sandwiches. For example, if you have 3 breads, 9 strips of bacon but only 10 tomatoes, this means that you can only make 1 BLT sandwiches, because the brea will run out first. The cost of this will be(1*6) or $6. The number of sandwiches has to be a whole number(Integer) and the price has to be **RETURNED**. **HINT** Look at the python built-in **min** function, this may help you out.

Sample Output:
```
>>> answer = sandwichCalculator(10,10,10)
>>> print( answer )
18
>>>answer = sandwichCalculator(3,16,13)
>>>print( answer)
6
>>> answer = sandwichCalculator(5,25,12)
>>>print(answer)
12
>>>answer =  sandwichCalculator(50,400,55)
>>>print( answer )
150
```

Function Name: waterBill()

Parameters:
consumption – An integer that gives you the gallons of water consumed
pricePerGallon – A floating point number that gives you the price of water per gallon.
discount – A number which tells you how much discount is to be computed. A 0 means no discount.

Functionality: For this program, you will have three parameters and using these parameters you will determine the water bill. Calculate the total cost as consumption * pricePerGallon, then apply the discount by multiplying the discount value by the total and subtracting it from the total.

Due to a drought in the area, if the water consumption is over 500 gallons, the price you pay for all gallons above 500 (501 and onward) is doubled, but you are still eligible for the discount on your total bill.

For example, if you used 600 gallons of water and the pricePerGallon was $3, and the discount amount this month was 0.10, the calculation would be:
TotalCost = 500*3 + 100 * 6 = 2100
BilledCost = 2100 - (2100 * 0.10) = 1890

Here are some sample test cases, make sure your function **RETURNS** and does not print.

```
>>> bill = waterBill(520, 1.00, 0)
>>>print( bill )
540.00
>>> bill = waterBill(520, 1.00,  0.5)
>>>print (bill)
270.00
>>> bill =  waterBill(100,1.00, 0.8)
>>>print ( bill)
20.00
>>> bill =  waterBill(500,10.00, .10)
>>>print (bill )
4500.00
```

Grading Rubric

Part 1 – Conversions – 50 points

Area –	15 Points
Function named correctly(area)	5 points
Performs correct conversion -	5 points
Prints the value -	5 points
areaOfCylinder -	15 Points
Function named correctly(areaOfCylinder)	5 Points
Performs correct calculation	5 points
Print statement with values to 3 decimal places	5 points
Seats -	20 Points
Function named correctly(seats)	5 points
Performs correct math	5 points
Prints value with appropriate message	10points

Part 2 – Complex Functions – 50 points

sandwichCalculaor	25 Points
Function named correctly(sandwichCalculator)	5 points
Correct calculation for number of sandwiches	10 points
Does not return a floating point number	5 points
Returns the correct price	5 points
waterBill	25 Points
Function named correctly(waterBill)	5 points
Performs correct calculations(w/o discount)	10 points
Performs correct calculations(w/ discount)	5 points
Returns correct value	5 points