Intro to CS in Python
Function Homework

Intro

This homework is worth 90 points. There are three parts and each part is worth 30 points. All parts must be turned in to the instructor at the deadline decided by the instructor. Otherwise the assignment will be marked late.

Note: Please read the comments given back to you for your assignment homework # 1. It provides feedback for what you have done, whether it is good or bad, to improve your coding style and efficiency. In this homework, we will tell you what functions you must write to complete the task assigned to you. You must make this functions. They can be complex or they can be simple; that is for you to decide. Remember to name your files correctly (we gave examples in the first homework). Good luck.

Part 1: Mumford's Bonfire

Mr. Mumford wants to add a fire pit to the Anning Lawn, however he needs to know how much material he will need to make the fire pit. Mr. Mumford said that he wants two rings, one inside the other, with the inner ring made of rock and concrete to hold the fire and the outer ring made of hard wood as seats for people to sit around the fire.

Let's make the assumption that the rings' edges are rectangles and if you cut a small section of the circle to look at it, it would be a rectangle. To find the `volume` of the ring, we will take the `circumference` of the circle and multiple it by the `area` of the rectangle section. We can do this for both the inner ring and the outer ring.

- First we need to find the area of the edge of a ring. We can make a function called `area(height,width)`. If you don't know the area of a square, don't be afraid to ask the instructor how to find it.
- Next, we need to find the circumference of the ring so we can multiple it by the area to get the volume. We should have a function called `circumference(radius)`. Remember, the circumference of a circle is 2*radius*pi.
- Finally, we need to find the volume of the material that the rings use. We can make a function called `volume(area, circum)`.

Note that I did not spell out circumference in the last function called volume. I did this for two reasons: to show you that you do not need complete words to say what you mean, and to prevent Python or the reader from being confused.

What is meant by the last point is if you have a function called `foo` and you later on try to make a function called `foo()`, Python won't be able to tell later on when you write `foo` if you meant the variable or if you incorrectly wrote the function `foo()`. The same goes for the reader when someone (like your instructor) is reading through your code, they might become confused.

Here is an example output:

```
Radius for inner ring: 3
Height of inner ring: 2
Width of inner ring: 1
3, 2, 1
Radius for outer ring: 8
Height for outer ring: 2.5
Width for outer ring: 1.5
```

```
8, 2.5, 1.5
*******************************
Inner::
Circumference: 18.84 ft
Material: 37.69 ft^3
Outer::
Circumference: 201.05 ft
Material: 753.96 ft^3
```

Remember to use the substitution for printing to get the format correct. Please print out things in order of entry after adding the three values for the ring.

Part 2: Secret Messages

It is rumored that the English teachers at MV use a secret code to communicate to each other in writing. After talking to Cambi we were not able to get the real secret code, but he gave us the rules which are the following:

`'e '` => `'wer'` replace any a after a space with `wer`
`'th'` => `'ll'`   replace all he with `ll`
`'y'` => `'ii'`   replace all y with `i`
`'o'` => `'xyx'` replace all o with `xyx`
`'a'` => `'qt et'` replace all a with `qt et`
`'t'` => `'pp'`   replace all remaining t with `pp`

For this program, we will have a run loop. A run loop is a loop that continues until the user tells it to stop. What we will do is have it take in sentences and output secret messages.
We'll just have a single function called `cypher(sentence)` that takes in a string that is in plain English and outputs the secret message.

```
Enter sentence (-1 to quit): this is a test to show you how the rules
work
Input: this is a test to show you how the rules work
Output: llis is qt et ppespp ppxyx shxyxw iixyxu hxyxw llwerrules
wxyxrk
Enter sentence (-1 to quit): the yoyo that you gave me broke
Input: the yoyo that you gave me broke
Output: llweriixyxiixyx llqt etpp iixyxu gqt etvwermwerbrxyxke

Enter sentence  (-1 to quit): -1
-1
```

Remember to do the rules in order. Be careful you apply them correctly.

Part 3: Secret Message breaker

Intro to CS in Python
Function Homework

The challenge here is to do what happens in part 2, but in reverse. Use the examples given from part 2 but you will decrypt your answers. All the rules are the same. Use a function called `decypher(sentence)` that takes a string that contains a secret message and outputs a text in plain English. You do **not** have to apply the rules in order like part 2.

gxyxxyxd jxyxb xyxn iixyxur hxyxmewxyxrk. i hxyxpweriixyxu qt etrwerenjxyxiiing piillxyxn sxyx fqt etr.