ECE-203 Programming for Engineers
Laboratory Experiment Week 5

Name: _____

Lab Assignments (Due end of this lab session)

(5 Points) Write a function that accepts a floating-point number and prints it to the display as a currency value (with a $ sign and two decimal places). Demonstrate your working program to the TA.

TA Initials _____

(5 Points) We have introduced two variable scopings in Python: global and local. For the following program, list all the variables that are **accessible** from the following namespaces: global, f(), g(), and main(). Next to each variable, write which namespace it belongs to.

```
1  a = 0
2  b = 5
3
4  def f(i):
5      n = 0
6      while n * n <= i:
7          n = n + 1
8      return n - 1
9
10 def g(a):
11     b = 0
12     for n in range(a):
13         i = f(n)
14         b = b + i
15     return b
16
17 def main():
18     global a, b
19     i = 10
20     b = g(i)
21     print(a + b + i)
22
23 main()
```

global	f()	g()	main()

(10 Points) The effective focal length f of a double sided convex lens of thickness d with surface curvature radii R_1 and R_2 is given by:

$$\frac{1}{f} = (n-1)\left[\frac{1}{R_1} - \frac{1}{R_2} + \frac{(n-1)d}{nR_1R_2}\right]$$

where n is the refractive index of the lens material. Write a function that computes f for a given set of parameters R_1, R_2, d, and n. Demonstrate your working function to the TA.

TA Initials _____

(20 Points) It is a well-known phenomenon that most people are easily able to read text where the words have two letters flipped — as long as the first and last letter of the word are unchanged. For example:

"I dn'ot gvie a dman for a man taht can olny sepll a wrod one way. (Mrak Taiwn)

Write a function `scramble(word)` that constructs a scrambled version of a given word, randomly flipping two characters other than the first and last one. Test this function for several words of different lengths and demonstrate for the TA.

TA Initials _____

Now, you will write a second function `build_sentence(string)` that will accept a string containing an entire sentence. Design your function to use `scramble(word)` from the previous step to construct your own transposed sentence similar to the example. The function `build_sentence(string)` should return a string containing the full sentence where the letters of each word have been scrambled by `scramble(word)`. Demonstrate that your `build_sentence()` function works to the TA.

TA Initials _____