C M S I   3 8 6

Quiz 1

The test is open-everything with the sole limitation that you neither solicit nor give help while the exam is in progress.

Problem	You got	Out of
1		10
2		10
3		15
4		15
5		10
6		10
7		15
8		15
TOTAL		100

1. Write a JavaScript function that takes in a function f and an array $[a_0, a_1, ..., a_{n-1}]$ and returns the array $[a_0, f(a_1), f(f(a_2)), ... f(f(... f(a_{n-1})))]$.

2. Repeat the previous problem using Python, writing your method to take in an list and a function.

3. Write two Python functions — we'll call them f and g, but you can call them whatever you want in your answer — such that every time you call f, you get back 10 less than the result of the previous call to f or g, and every time you call g, you get back three times the absolute value of the result of the last call to f or g. Now here's a catch: you must arrange things so that any "state" you need is completely private to f and g.

4. Repeat the previous problem in JavaScript, remembering to write your two
    functions to share private state. (You won't have classes to hide the state, so
    you'll have to rely on what you heard in class about how JavaScript hides
    information.)

5. Write a JavaScript function to return the number of ASCII vowels in a string. Make your function a **one-liner** by using `match` (or `split`) and `length`. (Although we haven't officially studied regular expressions in class, you should still be savvy enough to figure out what you need under pressure.)

6. Repeat the previous problem in Python.

7. Consider this Python script:

```python
a = [lambda: i for i in range(10)]
b = [a[i]() for i in range(10)]
```

At the end of this script, what is the value of b? Explain in detail why this is. A sketch will be very helpful and improve your chances of getting full credit. Running the script and simply reporting the value of b is worth only 2 points, so make sure you can explain the value.

8. Consider this JavaScript script:

```javascript
var a = [];
for (var i = 0; i < 10; i++) {
    a[i] = function () {return i;}
}
var b = [];
for (var j = 0; j < 10; j++) {
    b[j] = a[j]();
}
```

At the end of this script, what is the value of b? Explain in detail why this is. A sketch will be very helpful and improve your chances of getting full credit. Running the script and simply reporting the value of b is worth only 2 points, so make sure you can explain the value.