

Week 2 Day 3 Lab – Closure and Module Pattern

1. Determine what this Javascript code will print out (without running it):

```
x = 1;
var a = 5;
var b = 10;
var c = function(a, b, c) {
    document.write(x);
    document.write(a);
    var f = function(a, b, c) {
        b = a;
        document.write(b);
        b = c;
        var x = 5;

    }

    f(a,b,c);
    document.write(b);
    var x = 10;
}

c(8,9,10);
document.write(b);
document.write(x);
}
```

2. Define *Global Scope* and *Local Scope* in Javascript.

3. Consider the following structure of Javascript code:

```
// Scope A
function XFunc () {
    // Scope B
    function YFunc () {
        // Scope C
    };
};
```

- (a) Do statements in Scope A have access to variables defined in Scope B and C?
- (b) Do statements in Scope B have access to variables defined in Scope A?
- (c) Do statements in Scope B have access to variables defined in Scope C?
- (d) Do statements in Scope C have access to variables defined in Scope A?
- (e) Do statements in Scope C have access to variables defined in Scope B?

4. What will be printed by the following (answer without running it)?

```
var x = 9;
function myFunction() {
    return x * x;
}
document.write(myFunction());
x = 5;
document.write(myFunction());
```

5.

```
var foo = 1;
function bar() {
    if (!foo) {
        var foo = 10;
    }
    alert(foo);
}
bar();
```

What will the *alert* print out? (Answer without running the code. Remember 'hoisting'.)?

6. Consider the following definition of an *add()* function to increment a *counter* variable:

```
var add = (function () {
    var counter = 0;
    return function () {
        return counter += 1;
    }
})();
```

Modify the above module to define a *count* object with two methods: *add()* and *reset()*. The *count.add()* method adds one to the *counter* (as above). The *count.reset()* method sets the *counter* to 0.

7. In the definition of *add()* shown in question 6, identify the "free" variable. In the context of a function closure, what is a "free" variable?

8. The *add()* function defined in question 6 always adds 1 to the *counter* each time it is called. Write a definition of a function *make_adder(inc)*, whose return value is an *add* function with increment value *inc* (instead of 1). Here is an example of using this function:

```
add5 = make_adder(5);
add5(); add5(); add5(); // final counter value is 15

add7 = make_adder(7);
add7(); add7(); add7(); // final counter value is 21
```

9. Suppose you are given a file of Javascript code containing a list of many function and variable declarations. All of these function and variable names will be added to the Global Javascript namespace. What simple modification to the Javascript file can remove all the names from the Global namespace?

10. Using the *Revealing Module Pattern*, write a Javascript definition of a Module that creates an *Employee* Object with the following fields and methods:

Private Field: name

Private Field: age

Private Field: salary

Public Method: setAge(newAge)

Public Method: setSalary(newSalary)

Public Method: setName(newName)

Private Method: getAge()

Private Method: getSalary()

Private Method: getName()

Public Method: increaseSalary(percentage) // uses private getSalary()

Public Method: incrementAge() // uses private getAge()

11. Write a few Javascript instructions to extend the Module of Question 10 to have a public *address* field and public methods *setAddress(newAddress)* and *getAddress()*.