Javascript Module Exercises

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);

// 1 – print global variable x

// 8 – print function variable a

// 8 – print local variable b

// 9 – print function variable b

document.write(b); // 10 – print global variable b

document.write(x); // 1 – print global variable x

2. Define Global Scope and Local Scope in Javascript.

A variable declared outside a function, becomes GLOBAL. A global variable has global scope: All scripts and functions on a web page can access it.

Variables declared within a JavaScript function, become LOCAL to the function. Local variables have Function scope: They can only be accessed from within the function.

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? No

(b) Do statements in Scope B have access to variables defined in Scope A? Yes

(c) Do statements in Scope B have access to variables defined in Scope C? No

(d) Do statements in Scope C have access to variables defined in Scope A? Yes

(e) Do statements in Scope C have access to variables defined in Scope B? Yes

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

var x = 9;

function myFunction() {

return x \* x;

}

document.write(myFunction()); // 81

x = 5;

document.write(myFunction()); // 25

5.

var foo = 1;

function bar() {

if (!foo) {

var foo = 10;

}

alert(foo); // 10

}

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.

var count = {

counter: 0,

add: function() {

return this.counter += 1;

},

reset: function() {

return this.counter = 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?

In the definition of add( ) shown in question 6, counter is the "free" variable.

A free variable is a variable referred to by a function that is not one of its parameters or local variables.

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

var make\_adder = (function (inc) {

var counter = 0;

return function (inc) {

return counter += inc;

};

})();

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?

Using Module Pattern 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( )

var Employee = (function() {

var name = "";

var age = 0;

var salary = 0;

let getAge = function() {

return age;

};

let getSalary = function() {

return salary;

};

let getName = function() {

return name;

};

let setAge = function(newAge) {

age = newAge;

};

let setSalary = function(newSalary) {

salary = newSalary;

};

let setName = function(newName) {

name = newName;

};

let increaseSalary = function(percentage) {

salary = getSalary() \* (100 + percentage) / 100;

};

let incrementAge = function() {

age = getAge() + 1;

};

return {

setAge: setAge,

setSalary: setSalary,

setName: setName,

increaseSalary: increaseSalary,

incrementAge: incrementAge

};

})();

11. Rewrite your answer to Question 10 using the Anonymous Object Literal Return Pattern.

var Employee = (function() {

var name = "";

var age = 0;

var salary = 0;

let getAge = function() {

return age;

};

let getSalary = function() {

return salary;

};

let getName = function() {

return name;

};

return {

setAge: function(newAge) {

age = newAge;

},

setSalary: function(newSalary) {

salary = newSalary;

},

setName: function(newName) {

name = newName;

},

increaseSalary: function(percentage) {

salary = getSalary() \* (100 + percentage) / 100;

},

incrementAge: function() {

age = getAge() + 1;

}

};

})();

12. Rewrite your answer to Question 10 using the Locally Scoped Object Literal Pattern.

var Employee = (function() {

var name = "";

var age = 0;

var salary = 0;

let emp = {};

let getAge = function() {

return age;

};

let getSalary = function() {

return salary;

};

let getName = function() {

return name;

};

emp.setAge = function(newAge) {

age = newAge;

};

emp.setSalary = function(newSalary) {

salary = newSalary;

};

emp.setName = function(newName) {

name = newName;

};

emp.increaseSalary = function(percentage) {

salary = getSalary() \* (100 + percentage) / 100;

};

emp.incrementAge = function() {

age = getAge() + 1;

};

return emp;

})();

13. 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( ).

var Employee = (function() {

var name = "";

var age = 0;

var salary = 0;

var address = "";

let getAge = function() {

return age;

};

let getSalary = function() {

return salary;

};

let getName = function() {

return name;

};

let getAddress = function() {

return address;

};

let setAge = function(newAge) {

age = newAge;

};

let setSalary = function(newSalary) {

salary = newSalary;

};

let setName = function(newName) {

name = newName;

};

let setAddress = function(newAddress) {

address = newAddress;

};

let increaseSalary = function(percentage) {

salary = getSalary() \* (100 + percentage) / 100;

};

let incrementAge = function() {

age = getAge() + 1;

};

return {

address: address,

getAddress: getAddress,

setAddress: setAddress,

setAge: setAge,

setSalary: setSalary,

setName: setName,

increaseSalary: increaseSalary,

incrementAge: incrementAge

};

})();

14. What is the output of the following code?

const promise = new Promise((resolve, reject) => { reject(“Hattori”); });

promise.then(val => alert(“Success: “ + val)) .catch(e => alert(“Error: “ + e));

Error: Hattori

15. What is the output of the following code?

const promise = new Promise((resolve, reject) => { resolve(“Hattori”);

setTimeout(()=> reject(“Yoshi”), 500); });

promise.then(val => alert(“Success: “ + val)) .catch(e => alert(“Error: “ + e));

Success: Hattori

16. What is the output of the following code?

function job(state) {

return new Promise(function(resolve, reject) {

if (state) {

resolve('success');

} else {

reject('error');

}

});

}

let promise = job(true);

promise.then(function(data) {

console.log(data);

return job(false);}

) .catch(function(error) {

console.log(error);

return 'Error caught';

});

Nothing is outputted