IS217 Final Exam

Answer the following questions in 1-2 paragraphs. Each one is worth 5 points.

1. What is a software design pattern? Why are they important?

A design patter is a general reusable solution to an occurring problem in software design. It can also be described as a blueprint to handle recurring problems in software development. They are important because they allow you to use the same basic solutions in problems that appear in software development. They are also important because they allow you to communicate better to another programmer; in essence they allow you to explain your ideas and problem solving skills better to any other developer.

1. What is unit testing? Why is it important? How would you use it?

Unit testing refers to the practice of testing certain functions and areas or units of our code. This gives us the ability to verify that our functions work as expected and return the expected value. Is important because it allows software designers to test pieces of their code to make sure they work as designed. I would use it to test a function I wrote in javascript to find any errors and if they are it should display they line that they are in.

1. Describe the relationship between HTML, CSS, and JavaScript.

The relationship between them HTML, CSS and Javascript is that HTML provides the structure for the document and creates the basic elements of the page. CSS on the other hand is use to provide a better look to those elements and make them more attractive for the end user. Finally the purpose of Javascript is to manipulate those elements of the webpage and create a more interactive experience.

1. Describe the purpose of the Singleton design pattern.

A singleton is a creational pattern focuses on the instantiation of a class to a single object. In the event of the instance already existing, it simply returns a reference to that object. It differs from a static class because the user can delay its initiation because they require some information that may not be available during initialization time. The purpose of a singleton pattern is to design code that doesn’t need to have a value at the beginning (initialization).

1. Describe the purpose of the Factory design pattern.

Factory is a creational design pattern it differs from the other patterns in its category is that it doesn't explicitly require us use a constructor. The purpose of this pattern is to define an interface for creating an object, that way the user doesn’t have to worry about repetition and can improve efficiency. So by using a factory pattern you can create objects without the need to repeat yourself

1. Describe the purpose of the publish and subscribe pattern.

A pub-sub is a behavioral design pattern and it’s similar to the observer pattern but the difference is that it tries to avoid dependencies between subscriber and publisher. Since it’s similar to the observer pattern its main purpose is keep track of code and react to those changes. It also help us identify what layers containing direct relationships which could instead be replaced with sets of subjects and observers. This effectively could be used to break down an application into smaller, more loosely coupled blocks to improve code management and potentials for re-use.

1. Describe the purpose of the decorator pattern.

A decorator is a structural design pattern incites code reusability and is a flexible alternative to using sub-classing. It allows the user to modify existing objects without the need to change the underlying code structure. A decorator pattern main purpose is that allows adding functionality or features later on; so it lets the user add stuff as he sees fit without the need to modify the entire code structure.

1. Write the JavaScript code that illustrates a decorator pattern.

function Coffee(){

this.cost = function(){

return 1;

};

}

//Decorator A

function Milk(coffee){

this.cost = function(){

return coffee.cost() + 0.5;

};

}

//Decorator B

function Whip(coffee){

this.cost = function(){

return coffee.cost() + 0.7;

};

}

//Decorator C

function Sprinkles(coffee){

this.cost = function(){

return coffee.cost() + 0.2;

};

}

1. Write the JavaScript code that illustrates a factory pattern.

var ClamPizza = function(oIngredientFactory){

Pizza.apply(this);

this.oIngredientFactory = oIngredientFactory;

};

ClamPizza.prototype = new Pizza();

ClamPizza.prototype.prepare = function(){

console.log("Preparing " + this.sName);

this.oDough = this.oIngredientFactory.createDough();

this.oSauce = this.oIngredientFactory.createSauce();

this.oCheese = this.oIngredientFactory.createCheese();

this.oClams = this.oIngredientFactory.createClam();

};

1. Write JavaScript pseudo code that illustrates the singleton design pattern.

class MySingleton

{

public:

static MySingleton \* GetInstance()

//static method that returns only instance of MySingletone

{

if (m\_pOnlyOneInstance == NULL) // if not yet instantiated

{

m\_pOnlyOneInstance = new MySingleton();

//create one and only object

}

return m\_pOnlyOneInstance;

}

private:

static MySingleton \* m\_pOnlyOneInstance;

//holds one and only object of MySingleton

MySingleton(); // private constructor

public:

// MySingleton functionalities

void foo();

bool goo();

int zoo();

};

1. What is jQuery and provide examples of why you would use it? When would you not choose to you it?

The most important use for jQuery is the effects you can accomplish, with less code than what it would take with JavaScript. The purpose of jQuery is to make it much easier to use JavaScript on your website. jQuery takes a lot of common tasks that require many lines of JavaScript code to accomplish, and wraps them into methods that you can call with a single line of code. You would use it so simplify things in AJAX. You would not use jQuery if you want to improve the efficiency of your application.

1. What is Backbone.js and how is it different than jQuery.

Backbone.js is basically an uber-light framework that allows you to structure your Javascript code in an MVC (Model, View, Controller) fashion where Model is part of your code that retrieves and populates the data. View is the HTML representation of this model (views change as models change, etc). Controller that in this case allows you to save the state of your javascript application via a hashbang url. Is mainly designed for developing single-page web applications. Finally it differs from JQuery because it designed to provide structure to an application.

1. Write the JavaScript code to select an element by tag.

var myLinkCollection = document.getElementsByTagName("a");

for (i = 0; i < myLinkCollection.length; i++) {

if (myLinkCollection[i].className == "link\_class") {

myLinkCollection[i].onclick = function() {

this.style.backgroundColor = "#f00";

}

}

}

1. Write the JavaScript code to select by ID

var myVariable = document.getElementById(myElement);

1. Write the JavaScript code to select an id and then add html to it.

var myContentHolder = document.getElementById("content");

myContentHolder.innerHTML = “we added the element”

1. Write the JavaScript code to create an element.

var myNewListItem = document.createElement("li");

var myNewLink = document.createElement("a");

1. What is Node.js?

Is a server-side solution for JavaScript, and in particular, for receiving and responding to HTTP requests. Node.js contains a built-in HTTP server library, making it possible to run a web server without the use of external software, such as Apache orLighttpd, and allowing more control of how the web server works. Node.js enables web developers to create an entire web application in JavaScript, both server-side and client-side.

1. What is the difference between unit and functional testing?

**Unit Test:** Is testing an individual unit, such as a method (function) in a class, with all dependencies mocked up.

**Functional Test:** Also knows as Integration Test, testing a slice of functionality in a system. This will test many methods and may interact with dependencies like Databases or Web Services.

Answer the following questions in 2-3 paragraphs. Each one is worth 10 points.

1. You have been hired to design and manage a team of developers tasked with creating a web application. How would you explain to your developer the importance of using standard design patterns when designing the system? Provide some practical examples that illustrate to your team how you will use the concept of design pattern within the project.

In the first place I wouldn’t have hired a developer who doesn’t know about design patterns because is pretty much a prerequisite. If I had to explain it to him I would start off by saying that a designed pattern helps improve efficiency and time by allowing to solve problems that have been already solved by another programmers. And I would also tell them if something were to happen to him I could hire another developer and he would be able to pick up right where he left off.

A perfect example for this is when and developers has to entry data manually for creating an object instead of that we could use a factory pattern to create the objects dynamically. Thus improving efficiency and avoiding repetition.

1. You have been hired to design and manage a team of developers tasked with creating a web application. How would you explain to your developer the importance of creating unit tests? Provide some practical examples that illustrate to your team why unit testing is important.

Unit testing is important because it allows programmers to test each unit or function of our code and see if they work as expected and return the expected value. In other words it allows breaking up the code in smaller pieces and seeing if those pieces do what they are designed for. On the other hand if you don’t use unit testing you might end up with a big pile of code that doesn’t do what it is supposed to.

They could use unit testing for example if they use a decorator pattern to add extra functionality to an object and to test whether or not that code performs as expected.

Bonus Points:

Create a repository on github and commit any file to it to demonstrate your ability to use Github. Include a link to the repository inside your test submission.