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 pattern is a set of standard approaches to common programing scenarios. It relies on the knowledge built up by other users in going through these scenarios and then it is standardized as a design pattern. They are important because they enable programmers to work on other people’s code without having to figure out the entire logic of the program. Security and efficiency are also addressed through design patterns

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

Unit testing is the process by which individual pieces of code are tested. Scripts are written to test the code and dummy data is often used to gauge the success of a piece of code. This is important because it can address problems before going to functional testing where the entire functionality of the code is tested. They are easier to fix at the local level that unit testing exposes.

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

HTML is used to structure and define the DOM elements on a webpage. CSS is used to style and position the DOM elements. JS is used to add interactivity, logic, and dynamic properties to the DOM elements.

1. Describe the purpose of the Singleton design pattern.

The Singleton design pattern ensures that objects which only need to be instantiated once are kept to that condition. If an object type singleton exists in memory, the pattern returns that object, else it creates a new one.

1. Describe the purpose of the Factory design pattern.

A Factory pattern is a pattern that enables a factory object to be in charge of creating other objects. By doing this, the code becomes more modular, allowing for changes to specific object types within their own constructors, but still only using one method for creating all object types. This allows for much easier updating, adding and removing of objects.

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

The Pub Sub pattern is used to subscribe an object to a subject by adding an event/channel layer between the sub and the pub. This allows for a looser coupling between pub subs therefore enabling easier unsubscribe, publish and subscribe methods. This exists in jQuery as .on .off and .trigger.

1. Describe the purpose of the decorator pattern.

A Decorator enables the addition of new methods to an object while the code is running. It also allows for less specific object definitions with the ability to customize objects for specific purposes. It significantly cuts down memory usage versus creating a lot of unique objects.

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

Function fruit(fuitType){

This.color = “yellow”

This.fruitType = fuitType

}

var lemon = new fruit(“lemon”)

lemon.setTaste = function(taste){

this.taste = taste

}

lemon.setTaste(“tart”)

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

function LinkFactory(){}

LinkFactory.prototype.makeElement = function (array, element) {

if (element === "a"){

createLinks(array);

}

};

function createLinks(array){

var linkList = [];

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

var link = document.createElement('a');

link.href = array[i];

link.textContent = i+1;

linkList.push(link);

}

return linkList;

}

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

Var instance

Function init(){

Return new singleton

}

if(typeof instance === “indefined”){

instance = init()

}

else return instance

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

jQuery is a popular framework for JS that is known for it’s ability to deal with cross browser event handling and standardizing how ajax works. I would use it for retrieving json objects and for event handling. I wouldn’t use jQuery is I was developing for a particular browser and efficiency was key. jQuery is a little bloated and can take some time to load if not cached

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

Backbone is a light-weight framework that provides JS with a Model View Controller pattern. The Model holds the data, the view is the representation of that data and the controller defines how the model and view interact. It’s different from jQuery in many ways, mainly in that it is a structural design pattern.

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

Var links = document.getElementByTagName("a”)

1. Write the JavaScript code to select by ID

Var whatever = document.getElementById("any-id”)

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

Var whatever = document.getElementById("any-id”)

Whatever.innerHtml = “<p>This test is long</p>”

1. Write the JavaScript code to create an element.

Var newLink = document.createElement("a”)

1. What is Node.js?

Node is serverside javascript. Programs are coded on the server using JS. It doesn’t need apache or tomcat to work.

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

Unit testing deals with testing individual bits of code throughout the process. The unit tests are coded within the program and are only meant to test a specific bit of code.

Functional testing is testing if the finished product behaves as it was intended and if all the functionality is working properly.

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.

I would start by stressing the use of design patterns because of the readability that they add to any code. Most programmers have had to deal with having to edit or fix someone else’s code and know how big of a pain in the ass that can be, especially if it’s all spaghetti code. Design patterns would eliminate this problem.

Second, I would stress the importance of using design patterns like the singleton and factory patterns in order to help with memory management, something that JS does not have built in and is done through design patterns like those mentioned above.

Lastly, I would make sure that everyone is using backbone because of the organizational properties that this design pattern/ framework affords. By separating our data and our views, the code would be more organized.

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.

I would stress that each persons code needs to run in the context of the application. Unit testing checks for compatibility and for correctness given certain parameters. If someone’s code affects the behavior of another developers code, although working at the local scope, it can cause major problems and delays when trying to interact with other code.

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.

https://github.com/matei1987/is217Final