IS683 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? How would you use them in the future?

In software engineering (or computer science), a design pattern is a general repeatable solution to a commonly occurring problem in software design.

Importance of design patterns:

* Design patterns can speed up the development process by providing tested, proven development paradigms.
* Reusing design patterns helps to prevent subtle issues that can cause major problems and improves code readability for coders and architects familiar with the patterns.
* Design patterns provide general solutions, documented in a format that doesn't require specifics tied to a particular problem
* Design patterns allow developers to communicate using well-known, well understood names for software interactions.

In future I’d use design patterns as a description or template to solve a problem that can be used in many different situations that can be used in many different ways.

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

Unit testing is a [software](http://searchsoa.techtarget.com/definition/software) development process in which the testable parts of an [application](http://searchsoftwarequality.techtarget.com/definition/application), called units, are individually and independently monitored for proper operation.

It’s important for the following reasons:

Unit testing allows you to execute your code right away and know that it works.

Since unit testing should start very early in the process of writing code, it can help to design an API in a better way.

Unit tests really work out your code and tell you how your code will act under many different scenarios.

Unit testing could be used as the base to move to the next levels in the software life cycle which is Integration texting. In addition to all the above it adds confidence to your code.

1. What is GIT and how is it used to manage software projects?

GIT is a very popular and efficient open source Version Control System.

GIT as Version control for a software project:

We’d need a version control system while writing a code so as to track the changes being to a particular module and to go back to the last (/older) version if the changes commit aren’t functioning as intended.

GIT as means to use/reuse codes for a software project:

Also, certain features like ‘Pull request’ allow you to raise a request to other GIT members to use their code.

GIT for collaborating teams:

In addition to this, GIT provides various ways to collaborate and share codes and related information between the members. GIT could also be to track issues pertaining to the software that is being developed.

1. Describe and diagram the CSS box model.

The **content area** is the area containing the real content of the element. It is located inside the *content edge*, and its dimensions are the *content width*, or *content-box width*, and the *content height*, or content-box height.

The **padding area** extends the content area with the empty area between the content and the eventual borders surrounding it. It often has a background, a color or an image (in that order, an opaque image hiding the background color), and is located inside the *padding edge*. Its dimensions are the *padding-box width* and the *padding-box height*.

The **border area** extends the padding area with the area containing the borders. It is the area inside the *border edge*, and its dimensions are the *border-box width* and the *border-box height*. This area depends of the size of the border that is defined by the [border-width](https://developer.mozilla.org/en-US/docs/CSS/border-width) property or the shorthand [border](https://developer.mozilla.org/en-US/docs/CSS/border).

The **margin area** extends the border area with an empty area used to separate the element from its neighbors. It is the area inside the *margin edge*, and its dimensions are the *margin-box width* and the *margin-box height*.



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

* HTML is used for structuring content.
* Cascading Style Sheets should be used for applying all visual styles.
* JavaScript should be used for (almost) all interactive functionality, and should always be referenced in separate files, never written into HTML.

Relationship:

**HTML** marks the content up into different structural types, like paragraphs, blocks, lists, images, tables, forms, comments etc.

**CSS** tells the browser how each type of element should be displayed, which may vary for different media (like screen, print or handheld device).

**JavaScript** tells the browser how to change the web page in response to events that happen (like clicking on something, or changing the value in a form input)

In a webpage all the above could be represented as:

<!DOCTYPE html> 🡺 **HTML**

<head>

<link rel=”stylesheet” href=”css/normalize.css”></link> 🡺 **CSS**

<script src=”js/vendor/main.js”></script> 🡺 **Javascript**

</head>

<body>

</body>

</html>

1. Describe the purpose of the Singleton design pattern.

A class of which only a single instance can exist

Intent:

Ensure a class has only one instance, and provide a global point of access to it.

Encapsulated “just-in-time initialization” or “initialization on first use”

1. Describe the purpose of the Factory design pattern.

As the name implies this pattern is used to create objects, you can use it when you need to create an object without knowing the exact class, for example you want to create a Pizza object but you don’t know if you need to create a CheesePizza or mozarellaPizza classes.

You can also use it if you need to create pre-configured classes where you need the same object several times only with some small configuration change.

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

The intent of PubSub pattern is:

* Define a one-to-many dependency between objects so that when one object changes state, all its dependents are notified and updated automatically.
* Encapsulate the core (or common or engine) components in a Subject abstraction, and the variable (or optional or user interface) components in an Observer hierarchy.
* The “View” part of Model-View-Controller.

1. Describe the purpose of the decorator pattern.

This pattern permits us to add features to an object without needing to subclass it. Instead we “decorate” (wrap) it with another object with the same interface that has the one feature we’re adding.

Example: Shopping cart in an e-commerce website.

1. Write JavaScript pseudo code that illustrates any design pattern that you can remember and identify the pattern you are illustrating.

**var element;**

**var agg = (function () {**

**var index = 0,**

**data = [1, 2, 3, 4, 5],**

**length = data.length;**

**return {**

**next:function () {**

**var element;**

**if (!this.hasNext()) {**

**return null;**

**}**

**element = data[index];**

**…**

**return element;**

**},**

**hasNext:function () {**

**return index < length;**

**},**

**};**

**}());**

**This example iterator pattern provides a way to access the elements of an aggregate object sequentially without exposing its underlying representation. The below snippet could be used to access the elements:**

**while (agg.hasNext()) {**

**// do something with the next element...**

**console.log("agg.hasNext() " + agg.next());**

}

**The key idea is to take the responsibility for access and traversal out of the aggregate object and put it into an Iterator object that defines a standard traversal protocol.**

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 a version control system? Provide some practical examples that illustrate to your team how you will use version control to manage the development of the project.

Version Control allows one to work on code, then commit what you've done, often saving it in multiple places for added peace of mind along the way. This means that if more than one person is working on the same bit of code and are both committing a handy notification will allow the users to assess the code that they are committing and what other users have committed.

Another benefit is that if a piece of code is committed that breaks your project; it's possible to revert just that piece of code, so the rest of the code lies intact.

I’d recommend GitHub being an Open source version control for the development activities where each GitHub User Interface has some extremely useful tools allowing developers to review each other's code, comment, 'fork' other people's code, amend it and request a pull to collaborate on various projects to name a few.

By adding Version Control to our workflow we can rest assured that your code is safe, is easily.

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 allows you to execute your code right away and know that it works.

Since unit testing should start very early in the process of writing code, it can help to design an API in a better way.

Unit tests really work out your code and tell you how your code will act under many different scenarios.

Unit testing could be used as the base to move to the next levels in the software life cycle which is Integration texting. In addition to all the above it adds confidence to your code.

As a web application developer, we use JavaScript for the user interface (UI) logic in your application to dynamically build the structure, to enable or disable portions of your UI, or to load data in the background. I’ve had an experience testing the system using some testing framework like – Mocha. Mocha tests run serially, allowing for flexible and accurate reporting, while mapping uncaught exceptions to the correct test cases. F

Following is the example code snippet:

describe('inet', **function** () {

     describe('#aton()', **function** () {

         it('should calculate the network representation as integer', **function** () {

             inet.aton('125.163.49.39').should.equal(2107846951);

*(above has been taken from My GitHub work:*

*https://github.com/bb245/Node\_Redis)*

In the above snippet we’re writing the test case to confirm the output of aton JavaScript programs returns the value as expected. That is aton programs converts the incoming IPv4 address, '125.163.49.39' to 2107846951. On success the testing frame work would display success confirmation and in case of an error prompts the statement causing the error. Y following this we can be assured that the code would be functional or not at the later stage of the project. Unit texting also provides an opportunity stop and re-look into the code at the early phase of the project in case of an issue, resolving of which would add confidence to the code and is beneficial to the team.

Answer the following questions in 1 sentence or less. Each one is worth 2 points each:

1. Name 5 HTML “tags” and identify what each one does
   1. \_\_\_\_
   2. \_\_\_\_
   3. \_\_\_\_
   4. \_\_\_\_
   5. \_\_\_\_

|  |  |  |
| --- | --- | --- |
| Tag | Info | Attributes |
| <col> | Column: defines the attribute values for one or more columns in a table. Used inside of a table or Colgroup | Span: number of columns the tag should span |
| <li> | List item: represents a list item of the Ordered (OL) or Unordered list 9UL) | Value: used in Ordered list to set the display value. |
| <meta> | Meta information: sets meta information for the page (like title, description) | Charset: specifies the character encoding used by the document.  Content: set the value of the document metadata  Name: the name of the meta information.  http-equiv: sets a pragma directive. |
| <p> | Paragraph: creates a paragraph | Global attributes |
| <nav> | Navigation element: section of a page that links to other pages or to parts within a tag: a specific with navigation links | Global attributes |

1. Calculate the golden ratio for a web page that has a maximum width of 960 px.

The golden ratio for max width of 960px is: 367px (smaller column) and 593px(larger column).

1. What is the proper name for the bolded HTML code part:

<a **href**=”www.google.com>Google</a>

“href” : Is an attribute. This attribute is called the hyperlink reference and is abbreviated to href for short. You can set the href attribute to any URL on the Internet or to any local page on the current site.

1. What is the proper name for the bolded HTML code part:

<**a** href=”www.google.com>Google</a>

“a” is refereed as an element. The link itself is created just like any other element, by enclosing a word or phrase (or other item) within the <a> element. The resulting content of the link is referred to as the anchor text. Since the destination at which the link point is metadata, it is specified in an attribute of the <a> element.

1. Write the CSS code that would turn each link green.

a :{ color: green;}

Where

‘a’ is the selector

‘Color’ the property and

‘green’ is the Value.

1. Explain the purpose of the CSS property float.

CSS property float specifies whether a fixed-width box should float, shifting it to the right or left with surrounding content flowing around it.

Possible values are:

inherit

left - floats the box to the left with surrounding content flowing to the right.

right - floats the box to the right with surrounding content flowing to the left.

none (default)

Example:

#img {

width: 20px;

float: left;

}

1. Explain the purpose of the CSS property clear.

The clear property specifies which sides of an element other floating elements are not allowed.

Example:

Imagine we are moving images with float let that is:

img  
{  
float:left;  
}

But after each image we would want to describe about the image. If we have a class by name text\_line the text would be aligned on the left side of the image in order to ensure the text is displayed at the bottom we need to have the CSS as below for class text\_line:

.text\_line  
{  
clear:both;  
}

1. Explain the difference between an ID and a Class within the context of CSS.

ID’s are unique

* Each element can have only one ID
* Each page can have only one element with that ID

Example:

<div id="footer"> … </div>

<div id="sidebar"> … </div>

Classes are NOT unique

* You can use the same class on multiple elements.
* You can use multiple classes on the same element.

Example:

<div class="classmine"></div>

<div class=" classmine "></div>

<div class=" classmine "></div>

1. Explain why you would include some JavaScript at the bottom of your web page rather than the top.

If you include external js files at the bottom of your page, you give the priority of your HTTP requests to the visual display that will be presented to the client instead of to the logic of interaction or dynamics.

1. Given the following CSS code, write the corresponding HTML code that would be required to trigger the CSS rule.

#myid .myclass h2 {

Color: green;

}

<div id=myid>

<h2 class=”myclass”> Answer to question21</h2>

</div>

1. What is the proper name for the bolded CSS code:

**H1 {**

**Color: blue;**

**}**

H1 {Color: blue;} is reffrerred to as Block

1. What is the proper name for the bolded CSS code:

H1 {

**Color: blue;**

}

“Color: blue” is referred to as Declaration

1. What is the proper name for the bolded CSS code:

**H1** {

Color: blue;

}

“H1 is referred to as Selector

1. What is the proper name for the bolded CSS code:

H1 {

**Color:** blue**;**

}

“Color” is referred to as Property

1. What is the proper name for the bolded CSS code:

H1 {

Color**: blue;**

}

“blue” is referred to as value

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.