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ICT 4510

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**Module 2 Homework Questions: JavaScript**

1. What is JavaScript?
   1. An object-oriented computer programming language that is commonly used to create interactive effects within web browsers. It is mostly used on the client side of the browser, but is now being used with node.js as a server side language. It’s syntax was influenced by the Java, C and ECMA Script programming languages, which makes it very interesting to program in. It was originally designed and developed with the company Sun Microsystems.
2. What can you do with JavaScript?
   1. JavaScript can be inserted anywhere within the HTML code of a web page, however, only the output of server-side languages is displayed in the HTML while the JavaScript code remains fully visible in the source of the webpage. It can also be linked as an external script JS document and still be viewed in the browser and is also functional. JavaScript at its core without any extensions or libraries or frameworks is used to make web pages that would originally be static, interactive. JavaScript is a growing and changing language on a rapid scale. With different libraries and frameworks like jQuery, React, and Angular, it uses the JavaScript to build interactive HTML elements in components. They make single page web applications that do not make the browser refresh the page ever time the content changes. In other words, the DOM stays in its original load, but the elements will change depending on the interaction from the user.
3. What does the <script> tag do?
   1. The script tag is used in an HTML document to define the beginning of a client-side JavaScript set of code. Within the opening and closing script tags in the HTML document, the developer can directly program the JavaScript so that both the HTML code and the JavaScript code are directly in the same document. As mentioned above, there is a better alternative to doing this by using the src attribute in the opening script tag. When you declare the opening script tag, you would then write a source with the abbreviation of src=””. Inside of those quotes, you type in the file path to the folder and then .js file that you have created separately outside of the HTML document. Once linked correctly into the HTML, the developer can begin writing the JavaScript code in the external JS document. By doing this, the developer does not write any code directly between the opening and closing script tags. Most of the time, script tags can be found at the beginning or at the end of the HTML document, instead of in the middle. This is because the script can either be run when the page begins to load or after it. I personally put them at the bottom because I would rather all of the static elements from the HTML load before the JavaScript is fired to the browser.
4. What are the two ways to reference JavaScript in an HTML document?
   1. As mentioned above, the two ways to reference JavaScript in the browser is directly in the HTML document by typing your JS code between the opening and closing script tags in the browser. The other option is to enclose the src attribute in the opening script tag. Once the source of the external JS file is found in your directory, the developer does not code the JavaScript between the opening and closing script tags. Instead, he or she will type all of their client-side JavaScript in the external JavaScript file. The JavaScript will still be read and rendered by the browser as long as the client has JS enabled in their browser, which is standard. By using an external JavaScript file or even external CSS stylesheet, it makes your HTML code cleaner and easily readable to another developer or user.
5. What are the benefits of placing JavaScript code in external JavaScript or .js files?
   1. I have touched upon this in the questions above with external JavaScript files. Some of the pros are that it allows for separation of concerns which is not usually a big deal when dealing with simple web pages, but when the page grows and the HTML file becomes more diluted, it is not smart to import your JavaScript directly between the two script tags. It allows caching which means that when the browser loads a script externally, it caches and saves the file for future use in the event that a user is visiting the web page over and over again for faster load times. Lastly, it accounts for more easily readable code. The smaller the HTML file is, the easier it is for us as people to be able to read and comprehend the web page code. It is easier to catch mistakes and is also way easier to pass the file on to another developer or designer that may also need to look, manipulate and understand your code. Just picture, if everything was in the same file…how confusing that may be for you or another designer and developer.
6. Compare JavaScript variables to arrays
   1. Variables in JavaScript or any programming language for that matter can be thought of as a container. Inside of those containers, you can directly place data and then later refer to them in your code by the name of the variable. An example of this would be *var dog = “Sammy”;. Later in the code you can write a string like “My dog’s name is” + dog.* This would print out to My dog’s name is Sammy. With arrays, you can also import variables into an array or declare the values of array indices on your own in an array. An array is also like a container, but stores data values at different positions under one single name “variable”. You can use a loop to loop over the array a certain amount of times to gain or produce different values of the data. An example of an array would look like *var arr = [“dog”, “cat”, “fish”, “bear”];* . In short, arrays are handy to store large amounts of data, similar to an object and variables are used for single lines of data. You CANNOT loop over one single variable.
7. What are two ways to add comments to a script?
   1. The two ways to add a comment to a JavaScript file are either single-line or multi-line comments. To define a single line comment, you simply start the comment with the // symbol and the follow with your comment. For a multi-line comment, you need to start the comment with /\* and end with \*/. The benefit to writing a multi-line comment is that you can add more information and layout your comment in a more organized and proficient way for either yourself or another developer to read in the future about what the above or below code means.
8. List all data types of JavaScript
   1. There are six different data types that are found in the JavaScript programming language. Originally there were five until the new ECMAScript 6 or ES6 standards have been generated and utilized. The current six data types are:
      1. Boolean: represents a logical entity and can have two values, true and false
      2. Null: one value of null (nothing or invalid)
      3. Undefined: a variable that has not been assigned a value has the value of undefined
      4. Number: unlike other languages, the number property represents any integer, double, or float (decimal) which is also available to be defined with symbolic values up to infinity with the positive OR negative symbol declarations. NaN also is considered a number type and stands for Not a Number. In other languages, you have to specify the number type before typing the value.
      5. String: represents textual data. It is a set of “elements” that are immutable which means that they cannot be modified after they have been declared.
      6. Symbol: lastly, the symbol has been brought to JavaScript with the new additions of ES6 standards. It is a unique and immutable primitive value and may be used as the key of an object property. According to the Mozilla Developer Network, other languages call symbols atoms.
9. What are conditional statements used for?
   1. These can also be known as the if and else statements in JavaScript and most any other programming language that is used in current times. Conditional statements are usually used for performing different actions for different decisions. The “if” statement would be used to specify a block of JavaScript code to be executed if the condition is true, when the “else” block of code will only be executed if the condition is false. The “else if” statement is used to specify a new condition if the first condition is false. There are also different conditional operators in JavaScript for simple one-line conditional statements like the ternary operator.
10. Types of Loops in JavaScript
    1. There are many different loops in the JavaScript language. Specifically, there are eight current types of loops that can be declared with JavaScript. These are:
       1. For Loop
          1. Used to repeat actions until specified condition if false
       2. Do While
          1. Repeats until a specified condition is false and usually executes once before the condition is checked.
       3. While
          1. Only executes if the condition evaluates to true. The condition test occurs before the statement in the loop is executed. If the condition returns false, the execution stops and control is passed to the statement following while. To execute multiple statements, use a block statement to a group of those statements.
       4. Labeled
          1. Provides a statement with an identifier that lets you refer to it elsewhere in your program.
       5. Break
          1. The break statement will be used to terminate a loop without a label.
       6. Continue
          1. The continue statement will be used to restart a loop.
       7. For In
          1. Iterates a specified variable over all the enumerable properties of an object.
       8. For Of
          1. Creates a loop iterating over iterable objects.
11. Explain the difference between an object method and property
    1. An object is usually a set of properties that are similar to an array but can be accessed differently and looped through differently. A property is a value that makes up the object and can be described similarly to that of a variable. Most of the time, these properties are simple single lines of data. In some cases, it makes sense to attach a function that performs an algorithm to a property of the object. In this case, this would be called a method.
12. What is the Document Object Model or DOM?
    1. This is a model that is mostly constructed by objects that contain different HTML elements and completely design and output the information to the webpage. The DOM can be manipulated with JavaScript and styles can be added with Cascading Style Sheets or otherwise commonly known as CSS. This involves, the <html> tags, <body>, internal <h1> tags and so on. The DOM also includes the closing tags to these HTML elements as well. With different single-page frameworks of JS, they have made the availability to update and change the DOM with user interactivity and not having to reload the page.
13. What are JavaScript Events?
    1. Quite briefly, they are known as “things” that happen to HTML elements. When the JavaScript is used in HTML pages, it can use the JavaScript to react to these events. It can either be something done by the user or programmed to automatically be done by the browser and or server using AJAX. There are countless different types of JavaScript events but the most popular that is used is most like the onclick event handler or even the keypress, keyup, keydown, etc. event handlers for user input. These are especially helpful when using the new HTML5 canvas element and the canvas JavaScript API for games and other interactive elements on the page.
14. What do browsers use to keep track of JavaScript errors?
    1. Many times the browser will display alerts and console logs to diagnose errors that may be found with the JavaScript that you are writing. In other cases, there are also browser storage options like local and session storage, as well as cookies. In most cases, the browser storage is used for data storage of a user or site information, not errors. Some IDEs also allow for debugging and in-terminal console logs for the user to be able to read. If the developer needs to debug his or her code, they have to open the developer tools that can be found in Google Chrome, FireFox, and Opera, as well as many other browsers for all information about the activity and load times of the web page or application.
15. What do tools such as the Firebug plugin and Chrome developer tools allow developers to do?
    1. As mentioned above, these tools allow the browser to display and test any further code that can be implemented onto the page without having to formally write the code in the IDE and or text editor. These tools also allow you to see all HTML elements and CSS styles, along with the sources of information on the page from the client and server scripts. Developers are also allowed to check browser system and local storage and cookies for the website and web page. They are able to also see loading data from the network and performance sections of the developer tools as well. The developer is allowed to use the mouse icon from the toolbar and identify a specific element that is located on the page, as well as any IDs or styles that are tied to it.