SCI ESSAY FOR FINAL TERM: WEB APPLICATION PROGRAMMING

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Week 3 Day 1: JavaScript Classes

In this lesson, we studied about JavaScript classes. We learned that JS classes are just a syntactic sugar that makes writing JavaScript constructor functions and implementing inheritance similar to other popular languages like C# and Java. Having experience in OOP in java, this lesson was fairly straightforward and easy to understand. We learned about different ways to write getter and setter methods, how and when to use super and extends keyword. We also studied about method overriding, polymorphism and encapsulation.

Week 3 Day 2: jQuery

In the jQuery lesson, we learned how to use this powerful JavaScript Library called jQuery to manipulate DOM elements. We learned various ways to select DOM elements using JQuery. We studied how to traverse through DOM elements using children, sibling, parent, etc links to get target nodes. We also learned how to get or set aspects of DOM nodes like innerHTML, attributes, style, etc.

Week 3 Day 3: Event Handling

We learned things like how to style DOM elements, how to respond to mouse events, keyboard presses, and so on. We also learned about the concept of ‘this’ in jQuery as well as the concepts like event bubbling and event loop. Overall, it equipped us with a very essential tool in our arsenal as a web developer.

Week 3 Day 4: Intro to Servlets

In this day, we had our first introduction to servlets. We reviewed the web dynamics and how the web server serves the data. We also had a walkthrough on how to set up Tomcat in VS Code. We learned what a servlet is, what a container is, and how they work together in order the serve the request. We studied about the servlet lifecycle and the methods like init(), service(), destroy(). We also learned what are HttpServletRequest and HttpServletResponse objects are and what data they hold. We learned how to receive a request (Get, Post, etc.), process them in their respective method like doGet() and doPost() and then send response to the client using using the HttpServletResponse object.

Week 3 Day 5: Managing State in Servlets

In this lesson, we learned about the ways we can manage state in our application. We also learned the difference between redirecting and forwarding requests. We understood why we need states and learned different ways that can be used to manage state like request scope, session scope, application scope. We learned how to create a session and save the required state in the session. And we also understood how by using the http cookie, we can share the session info with the client and server. We also touched a bit on cookie security and how to securely communicate between server and client.

Week 3 Day 6: Java Server Pages

In week 3 day 5, we learned about Java Server Pages (JSP). JSP is useful in the model 2 architecture also known as MVC(model, view, controller), where JSP acts as view. We learned that we can do almost all the java coding inside JSP using scriptlets, but it's considered very bad practice and not scalable, so we learned other ways to separate the view with the business logic using EL expressions, and JSTL. We studied how we can separate the concerns to three different parts where JSP will act as view, Servlet will act as controller and normal java class will act as models. We learned various ways to display data using EL expressions as well as JSTL tags. Learning JSP definitely made writing the html template easier than writing them in the servlet itself inside PrintWriter object.

Week 4 Day 1: JSP Tag Libraries

In this lesson, we studied about JSP Tag Libraries, and we learned ways on how to make the custom tags. It was interesting to know that developers can create their own custom tags to display in the web page. We learned how to write .tld file where we had to put some configuration code about our custom tags. We also learned that we need to extend SimpleTagSupport and and overwrite doTag() method to create our custom tag.

Week 4 Day 2: AJAX and JSON

In this lesson, we learned what is AJAX and JSON, and how to use them to request/response data between client and server. We learned about jQuery wrapper functions like $.ajax(), $.get(), and $.post(). We also studied a bit about Same Origin Policy and how XMLHttpRequest has implemented security restriction. Apart from what, we learned how to write data in JSON format, and serializing and deserializing from string to json and json to string respectively by using JSON.parse() and JSON.strigify().

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The lessons we learned in this block is reminiscent of the SCI principle "Enjoy greater efficiency and accomplish more". This principle states that we need to aspire to be always as efficient as

possible, because being efficient means we have enough time and resources to accomplish more things than normal. For example, a start of the art computer is capable of calculations far exceeding earlier models. The more efficient the machines are, the more computations and research we can carry out to fix every day problems and improve the quality of life.

Similarly, in this course, we started out by writing the most basic html, css and javaScript. Just using these three things in it's pure form, it was not very efficient, and took long time even to do the simplest tasks. For example, to make something happen if a button is clicked, we had to use long and clunky processes in JavaScript. Then came jQuery which made the event handling much easier and efficient. Also, writing html template inside Servlets was very troublesome and took long time and effort, but we aspired to be efficient and used JSP instead, which made writing templates and interacting with java code much easier. We were also able to break down the system architecture into three parts (MVC). And with AJAX and JSON, making server calls became a breeze. Now we are able to create complicated, secure, and efficient web applications in a short amount of time.

Our lessons is very much in relation with this SCI principle "Enjoying greater efficiency and accomplish more". Because, in every step of our course, we were trying to understand the fundamentals first and them try to do them in more efficient manner using latest technologies, disciplines, and conventions so that we can make better, secure, robust, and well-designed web applications in short amount of time.