**Rich Web Lab 4 Questions**

1. **Explain using code examples what is meant by props and state in React JS?**

* A prop is the data which is passed into a React component. A prop works in a similar way to arguments being passed into a JS function.
* Props are part of what’s known as a pure function. A pure function is a read only function, which means that one can’t change its components by modifying its own props.
* One can however change the state of a component.

In this example the react component App is getting a prop subject with a value “Philip”:



* State in React JS is used for managing data
* As mentioned above props are read only, states data on the other hand can be modified by its own component.
* States are private and cannot be accessed from the outside unlike props.

1. **In functional programming, what does the term functor mean? Can you give an example in JavaScript?**

* A functor is a data object that can hold elements of any data type and which implements the map operation. The map operation is a function.
* The functors map() function takes, as an argument, another function and calls that function for each element of the functor resulting in a new functor.
* The map function always creates a new functor the exact same size as the old one.
* A Java script example would be a functor of strings being turned into a new functor of integers e.g.

Text, letter

Description automatically generated

1. **We have looked at three kinds of asynchronous programming mechanisms, namely callbacks, promises and streams. Mention one advantage and one disadvantage of each type.**

Callbacks:

* An advantage of using callbacks is that they allow you to wait for the result of a previous function call and then execute another function call. This helps us develop asynchronous JS code.
* A major disadvantage of using callbacks is that they don’t scale well for any asynchronous code that’s even moderately complex.

Promises:

* Advantages of using promises in JavaScript is that they improve code readability, and they are also better at handling asynchronous operations than compared to the likes of callbacks.
* Some disadvantages of using promises are that they only return one object, and they can’t return multiple arguments. Promises also kill the purpose of asynchronous non-blocking input output.

Streams:

* Advantages of streams are that they make the code a lot easier to read, it allows you to compact functions into fewer lines of code
* A major disadvantage that I found with streams is that they are hard to implement.

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1. **With the aid of a diagram and example code, describe the Cascading Style Sheets (CSS) Box Model and show how it can be used to space DOM elements**

* The css box model is essentially a box that wraps around every html element. As you can see from the diagram below it consists of padding, border and margins.

A picture containing diagram

Description automatically generated

* Content: is the content i.e. text, image etc
* Padding: clears an area around the content (transparent)
* Border: goes around the padding and content
* Margin: clears an area outside the border. (transparent)

**Sample css box code:**

Text

Description automatically generatedShape, rectangle

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1. **Detail how the browser loads and bootstraps a rich web application from an initial URL.**

* The first thing that happens is the browser goes to the domain name servers, an address book that tells where the website is
* The second thing that happens is the browser makes a TCP/IP connection to server IP address and designated port associated with the URL. Basically what happens is these protocols I just mentioned will tell the files to load the website and where to locate the server
* An application server HTTP proxy, listening at that IP address, accepts the connection from the browser.
* The browser then sends the HTTP request over to the, now open, TCP/IP connection.
* Lastly the application server parses the request and responds to the browser over the same open TCP/IP connection, delivering the files needed.